SYLLABUS OF LABORATORY WORK

IN

MATERIA MEDICA AND THERAPEUTICS

FOR USE IN

MEDICAL COLLEGES.

BY

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DESK INVOICE.

Each student will observe that he is furnished with the following apparatus and that he is held personally responsible for its safe return to the college.

FOR EACH STUDENT SEPARATELY.

2 beakers.
1 wash bottle.
1 porcelain evaporating dish, 5 inch.
1 porcelain evaporating dish, 3 inch.
1 glass funnel, 5 inch.
1 glass funnel, 3 inch.
1 glass graduate, 4 ounce (Apothecary and Metric.)
1 glass graduate, 2 drachms (minims.)
1 wedgewood mortar and pestle.
1 glass mortar and pestle.
1 glass stirring rod.
1 steel spatula, 6 inch.
1 horn spatula, spoon end.
1 retort stand, 3 rings.
1 filter stand, for 4 funnels.
10 test tubes.
1 test tube rack.
1 test tube swab.
1 copper water bath.
1 wire gauze, 6 x 6.
1 porcelain pill tile, 8 x 10.
1 percolator and packer.
1 pipe-stem triangle.
2 butter chips.
1 key.

APPARATUS AT EACH DESK.

1 Bunsen burner with rubber tubing.
1 bottle red litmus paper.
1 bottle blue litmus paper.
1 scale outfit.

EACH SCALE SET CONSISTS OF THE FOLLOWING:

1 No. 6 army scale.
1 set Troy weights from 1 grain to 2 drachms.
1 set Metric weights from 1 milligram to 20 grams.
1 pair brass forceps.

Materials for the work will be found on the general shelf, on the individual desks or can be obtained from one of the assistants.

Always report breakage or absence of any of the apparatus at the exercise during which it is noticed.

Always invoice the desk when assigned to it or if changed to another, so that you will not be charged with any apparatus that is not in the desk. Report apparatus absent, if any.

GENERAL LABORATORY RULES.

1. Students coming more than 15 minutes after the exercise has commenced will be marked late, and two lates will count as an absence.
2. Overcoats and umbrellas must not be brought into the laboratory. They may be left in the basement cloak-room.
3. Keys for the desks are to be taken from the key-board on entering the laboratory and must be returned to the board before leaving.
4. Report any breakage during the exercise at which it occurs.
5. ALL SOLID WASTES should be placed in the jars on the desks and NEVER in the sinks or on the floor.
6. Always clean up and put away all apparatus used, sponge off the top of the desk and see that the desk is cleaned and locked before leaving.
7. Each student will be held responsible for the proper care of his desk and for the safe return to the college of all apparatus put at his disposal, whether as an individual or as a member of the class.
8. The bottles, containing materials for common use, must be left at the shelf and under no circumstances should they be carried to the individual desks. Additional supplies, if needed, can be obtained from the assistants. Small dishes, containing supplies on the individual desks, are to be left on the desks.
9. Smoking, chewing tobacco and boisterous conduct in the laboratory are positively prohibited.

SCALE RULES.

1. Scales are assigned as follows and the desk occupants are responsible for the condition of the scale assigned them:

No. 1	to desks	1– 6.	No. 10	to desks	55– 60.
" 2	"	7–12.	" 11	"	61– 66.
" 3	"	13–18.	" 12	"	67– 72.
" 4	"	19–24.	" 13	"	73– 80.
" 5	"	25–30.	" 14	"	81– 88.
" 6	"	31–36.	" 15	"	89– 96.
" 7	"	37–42.	" 16	"	97–104.
" 8	"	43–48.	" 17	"	105–112.
" 9	"	49–54.	" 18	"	113–120.

2. Always lower the scale pans when through weighing, changing the weights, emptying the pans, etc.

3. Always return the forceps and weights to their proper places in the scale drawer and close the drawer before leaving the scales.

4. Always clean up anything spilled around the scales while weighing.

GENERAL INSTRUCTIONS FOR TESTS.

Always read up the preparations of each exercise before coming to the laboratory. Each student is required to record his results.

Use as small amounts of the materials in all the experiments as possible or as is necessary, unless otherwise directed as to the amount.

The Genitive case ending is given immediately following each word of the official name that is not already in that case or that changes to form the genitive.

Observe carefully with each specimen presented for examination:

CRUDE VEGETABLE DRUGS—

1. Part exhibited, whether bark, leaves, wood or root.
2. Odor.
3. Color.
4. Taste.
5. Official description (N. D. or U. S. P.)

PHARMACEUTICAL PREPARATIONS—

1. Color.
2. Form (liquid or solid; crystalline, amorphous, granular, etc.)
3. Odor.
4. Taste, unless cautioned not to do so.
5. Deliquescent or efflorescent.
6. Weight, whether comparatively heavy or not.
7. *Solubility:*—Put a small amount of the specimen to be examined in a t. t. and add about twenty times its bulk of Aqua Destillata from the wash bottle; agitate thoroughly and see whether solution occurs. If not, apply heat, gradually bringing to a boil, and notice the result. Repeat the test as above using Alcohol or an acid instead of the water.

8. *Action of Heat:*—Put a small quantity in a perfectly dry small t. t. and apply heat, gradually bringing to a boil or redness, and notice the effect. Examine properties of the residue, if any when the tube becomes cool.

9. *Reaction to Litmus Paper:*—Put a little of the specimen in a perfectly clean t. t., add a small amount of Aqua Destillata, gently heat, and test the reaction first with a strip of blue and then of red litmus paper.

SOLUTIONS—

1. Add the darker to the clearer or lighter liquid.
2. First add a drop or two carefully and then more if necessary.
3. Observe carefully any change that takes place before shaking the tube. Shake the tube thoroughly so as to have an intimate mixture of the contents, if no reaction is produced without this.
4. If a precipitate forms, notice whether it increases in amount or redissolves as more liquid is added or as the tube is shaken.
5. State, if possible, in your notes whether the phenomena are chemical or physical, and explain if you can, the reasons for the reactions.

ABBREVIATIONS—

LOOK up in your text books.

N. D.—National Dispensatory.
N. F.—National Formulary.
P. H. B. — Potter's Hand-book of Materia Medica and Therapeutics.
P. Q. C.—Potter's Quiz Compend of Materia Medica.
S. P. C.—Stewart's Pharmacy Compend.
U. S. D.—United States Dispensatory.
U. S. P.—United States Pharmacopœia.
W. & W.—White & Wilcox Materia Medica.

WEIGHTS AND MEASURES.

METRIC WEIGHTS. (P. Q. C.)

1 milligramme (mg.), 0.001 = gr. $\frac{1}{64}$.
1 centigramme (cg.), 0.01 = gr. $\frac{1}{6}$.
1 decigramme (dg.), 0.1 = gr. $1\frac{1}{2}$.
1 gramme (gm.), 1. = gr. 15.432.
1 kilogramme (kilo), 1000. = lbs. 2.7.
1 gm. = weight of 1 c.c. of Aqua Destillata at 4° C.

METRIC MEASURES. (W. & W.)

1 cubic centimetre (c.c.) (millilitre), = 0.001 = M. 16.23.
1 litre (L.) = 1. = fl.℥ 33.81.

APOTHECARIES' (TROY) WEIGHTS. (P. Q. C.)

Pound.		Ounces.		Drachms.		Scruples.		Grains.
lb.		℥		ʒ		℈		gr.
1	=	12	=	96	=	288	=	5760
		1	=	8	=	24	=	480
				1	=	3	=	60
						1	=	20

APOTHECARIES' OR WINE MEASURE. (P. Q C.)

Gallon.		Pints.		Fl. ounces.		Fl. drachms.		Minims.
C.		O.		Fl.℥		Fl.ʒ		M.
1	=	8	=	128	=	1024	=	61440
		1	=	16	=	128	=	7680
				1	=	8	=	480
						1	=	60

A drop (gt.) is about one M.
A tea-spoonful is about one fl.ʒ.
A dessert-spoonful is about two fl.ʒ.
A table-spoonful is about one half a fl.ℨ.
A wine-glassful is about one and one-half to two fl.ℨ.
A tea-cupful is about five fl.ℨ.
A breakfast-cupful is about eight fl.ℨ.
A glassful is about eleven fl.ℨ.

PRESCRIPTIONS.

1. Study carefully the article on prescription writing in P. Q. C., pages 229–241, or in any text book on Materia Medica containing such an article.
2. Look up the comparison of weights and measures P. Q. C., page X.
3. Write legibly. Sign desk number for name.
4. Use both Apothecary and Metric systems in each prescription, writing it in one system and placing the equivalent in the other system. The decimal line is preferable to the point in the Metric system and it is better form to fill out two decimal places. Roman numerals are used to indicate the Apothecary amounts and Arabic for the Metric amounts. Transposing from one system to the other take 1 gm. as equal to 15 gr., and 1cc. to 15M.; or 4 gm., or 4cc. to 1 dr. (A general rule.)
5. Each prescription should be compound and contain at least one of the pharmaceutical preparations considered in the day's exercise.
6. FORM—

   (*a*) SUPERSCRIPTION: Name of the person (with age and disease in parenthesis so the instructor may have an idea of the writer's intentions), date and the sign ℞ for Recipe (take thou.)

   (*b*) INSCRIPTION: (Official Latin names only should be used.) Do not mix Latin and English names.

   Basis (always present.)

   Adjuvant (may be present.)

   Corrective (may be present.)

   Vehicle (generally present.)

(*c*) Subscription: M., Mis., or Misce (mix thou) followed by the directions for the pharmacist, which may be in Latin and are better without contractions.

(*d*) Signature: S., Sig. or Signa. (write thou), followed by the directions for the patient, written in English and with no contractions.

The signature of the prescriber.

Order all liquid mixtures to be thoroughly shaken, thereby doing all in your power to insure equable dosage.

7. Prescription Writing—

(*a*) Write the Subscription first.

(*b*) Determine the Basis desired and then whether necessary to have Adjuvant, Corrective or Vehicle present, and if so what of each is best. The names of the preparations composing the Inscription are almost always in the Genitive case, their amounts being in the Accusative case.

(*c*) After Misce write the number of the doses required, depending upon the character of the sickness (acute or chronic).

Determine the kind of mixture (liquid or solid).

Special directions for compounding if any.

(*d*) After Signa write for shake label if a liquid mixture, then determine the size of the dose and method of its administration. Size of the dose depends upon the age and sex of the patient, individual physiological resistance and drug idiosyncrasies of the patient, the disease (acute or chronic), the activity of the preparation, the frequency and method of its administration.

(*e*) Determine the size of the dose of each preparation in the prescription and multiply this by the number of doses to obtain the amount of each ingredient to be used.

8. Incompatibilities: Must be considered in writing the Inscription. Always determine the reasons for them, what is formed, etc.

(*a*) *Chemical*:—Is not always evident to the eye immediately or upon standing; depends upon the principle of double decomposition or the possibility of the formation of less soluble or more volatile compounds under the conditions surrounding the mixtures such as changes of temperature, agitation, exposure to light, etc. May not be sufficient to interfere with the efficiency of the prescription.

(*b*) *Pharmaceutical or Physical:*—Prescribing of preparations which are immiscible under the conditions surrounding the mixture. The changes are physical and not chemical, depending chiefly upon the question of solvents and solubility. Usually occurs when solids or liquids are added to solutions thereby changing their density, the proportionate strength of the required solvents, etc.

(*c*) *Therapeutical or Physiological:*—Depends upon the physiological actions of the component preparations in the sized doses given and thus rendering the effects of each negative.

LATINIZING A PRESCRIPTION. (P. Q. C.)

TABLE OF GENITIVE CASE-ENDINGS.

NOM.	GEN.	EXCEPTIONS.
a	ae	Cataplasma, Enema, Physostigma, Aspidosperma and Gargarysma, all have the genitive in *-atis*. Coca† is unchanged. Folia is plural; gen. Foliorum.
us um os on	i	Rhus, Rhois; Flos, Floris; Bos, Bovis; Limon, Limonis; Erigeron, -ontis. Fructus, Cornus, Quercus, Spiritus, Haustus, Potus, do not change.
as	atis	Asclepias, -adis; Mas, Maris.
is	idis	Pulvis, -eris; Arsenis, -itis, Phosphis, -itis, Sulphis, -itis, and all salts ending in -is, having genitive in -itis.
o	onis	Mucilago, -inis; Ustilago, -inis; Solidago, -inis.
l	lis	Fel, Fellis; Mell, Mellis; Sumbul, Sumbuli.
		Words which do not change in the Genitive:
en	inis	*Amyl. Coca.† Haustus. Quercus.
ps	pis	Azedarach. Cundurango. Hydrastis. Sassafras.
rs	rtis	Berberis. Cornus. Jaborandi. Sago.
r	ris	Buchu. Curare. Kino. Sinapis.
x	cis	Cannabis. Digitalis. Matico. Spiritus.
		Catechu. Fructus, Potus.

*Amylis, is given. †Cocae, is given.

VERBS.

The verbs used in prescription-writing are nearly all in the imperative mood, giving directions to the compounder, and having their object in the accusative case. Such are—

Adde, add.	*Macera*, macerate.
Cola, strain.	*Misce*, mix.
Divide, divide.	*Recipe*, take.
Extende, spread.	*Signa*, write.
Fac, make.	*Solve*, dissolve.
Filtra, filter.	*Tere*, rub.

A few verbs are found in the subjunctive mood, taking their subject or predicate in the nominative case. The most usual are:

Fiat, let be made.	*Bulliat*, let boil.
Fiant, let be made.	*Capiat*, let take.
Coletur, let be strained.	*Detur*, let be given.
Coloretur, let be colored.	*Dividatur*, let be divided.
Sumatur, let be taken.	*Sit*, let it be.

PARTICIPLES.

Participles or Verbal Adjectives are occasionally used, and should agree with their respective nouns in gender, number and case. Such are the following, viz.:—

Dividendus, *-a*, *-um*, to be divided.
Sumendus, *-a*, *-um*, to be taken.
Adhibendus, *-a*, *-um*, to be administered.

PREPOSITIONS.

Those in the first column require the noun following to be in the accusative case,—those in the second column require the ablative case.

Ad, to, up to.	*Cum*, with.
In, into.	*Pro*, for.
Supra, upon.	*Sine*, without.

Ana, of each,—governs the genitive case.

SUNDRY WORDS AND PHRASES, IN MOST FREQUENT USE.

Bene, well.
Bis, twice.
Dein, thereupon.
Et, and.
Gradatim, gradually.
Guttatim, by drops.
In dies, daily.
Da, give.
Non, not.
Numerus, number.
Octarius, a pint.
Semel, once.
Simul, together.
Statim, at once.
Ter, thrice.
Quater, four times.
Non Repetatur, let it not be repeated.
Ad saturandum, to saturation.
Numero, to the number of.
Quantum sufficiat, as much as necessary.
Pro re nata, according to need.
In parties æquales, into equal parts.
Redactus in pulverem, let be pulverized.
Secundum artem, according to art.

MATERIA MEDICA EXERCISES.

MATERIA MEDICA.

EXERCISE No. 1.

PEPSINUM, I, U. S. P.—Pepsin.

Look up its history, properties, method of preparation, and uses. (N. D.)

Pharmaceutical Preparations—

Pepsinum,–i Saccharatum,–i, U. S. P.—Saccharated Pepsin.

Glyceritum,–i Pepsini, N. F.—Glycerite of Pepsin.

Liquor,–is Pepsini Aromaticus,–i, N. F.—Aromatic Solution of Pepsin, Aromatic Liquid Pepsin.

Vinum,–i Pepsini, N. F.—Wine of Pepsin.

Properties and Uses—

Pepsinum and *Glyceritum Pepsini* are the best preparations.

The hygroscopic properties, which are increased by the presence of Peptone, makes them inappropriate for prescribing in powders.

Aqueous solutions decompose rapidly, but Acidum Hydrochloricum will keep the solutions clear, though it will not prevent the loss of action on albuminous foods, etc. Glycerinum preserves and aids their actions. Saccharum Lactis is the best diluent for powders, pills or capsules.

Incompatibles—

Alcohol, Acidum Tannicum, alkali carbonates and bicarbonates and mineral acids.

Tests—

1. Heat an aqueous solution, acidified with Acidum Hydrochloricum, to boiling and note its milky change or flocculent white precipitate. Presence of mucus increases the opalescence, especially upon the addition of Acidum Aceticum. Dry heat to 100° C (212° F) does not affect injuriously.
2. Add a drop of Tinctura Iodi to an aqueous solution and if a blue or purplish-red color does not develop, no starch or dextrine are present.
3. Look up U. S. P. tests for strength and purity.

CARICA PAPAYA—Papain, Papayotin, Papoid.

Look up its history, preparation and action.

INGLUVINUM,-I—Ingluvin.

Look up its tests, history, preparation and action.

PANCREATINUM,-I, U. S. P.—Pancreatin.

Look up its origin, method of preparation, composition and action.

Properties and Uses—

Very hygroscopic, hence keep in well stoppered bottles.

Aqueous solutions are precipitated by heat, Alcohol and Acidum Hydrochloricum, but not by saturated solution of Sodii Chloridum.

Glycerinum and Saccharum Lactis retard deterioration.

The gastric juice interferes with its action, hence it is best given as enemata with food or in pills coated with shellac (enteric pills) which are not dissolved until in the alkaline juices of the intestines.

Tests—

1. Make a starch paste, add solution of Pancreatinum and test a few drops with Tinctura Iodi until failure to get a blue formation indicates complete conversion into sugar. This test shows its action on carbohydrates.

2. Add a little Pancreatinum solution to some Oleum Morrhuae and note its emulsification and how the addition of an acid breaks it up.

OLEUM,–I MORRHUAE, U. S. P.—Cod Liver Oil.

Examine the specimen carefully.

Look up its origin, preparation, properties and uses.

Emulsified best with Mucilago or Yolk of Egg and flavored to suit the taste of the patient. Acids decompose the emulsions.

MINERAL ACIDS.

ACIDUM,–I HYDROCHLORICUM,–I, U. S. P.— Hydrochloric Acid, HCl, 31.9%, 1.160 sp. gv.

ACIDUM,–I NITRICUM,–I, U. S. P. — Nitric Acid, HNO_3, 68%, 1.414 sp. gv.

ACIDUM,–I SULPHURICUM,–I, U. S. P. — Sulphuric Acid, H_2SO, 92.5%, 1.835 sp. gv.

ACIDUM,–I PHOSPHORICUM,–I, U. S. P.— Phosphoric Acid, H_3PO_4, 85%, 1.710 sp. gv.

All have dilute (10%) preparations.

Look up in N. D. and try their incompatibilities.

Write a Prescription.

EXERCISE No. 2.

ARSENUM,–I—Arsenic—As.

PHARMACEUTICAL PREPARATIONS—

Acidum,–i Arsenosum,–i, U. S. P. — Arsenous Acid — As_2O_3, White Arsenic, Arsenic.

Liquor,–is Acidi Arsenosi, U. S. P.—Solution of Arsenous Acid.

Liquor,–is Potassii Arsenitis, U. S. P.—Solution of Potassium Arsenite.

Sodii Arsenas,–atis, U. S. P.—Sodium Arsenate—$Na_2HAsO_4.7H_2O$.

Liquor,–is Sodii Arsenatis, U. S. P. — Solution of Sodium Arsenate.

Arseni Iodidum,–i, U. S. P.—Arsenic Iodide—AsI_3.

Liquor,–is Arseni et Hydrargyri Iodidi, U. S. P.—Solution of Arsenic and Mercuric Iodide.

Which is Donovan's, Fowler's and Pearson's solution?

Look up poisoning and its treatment.

PREPARE LIQUOR POTASSII ARSENITIS—

Take 1 gm. Acidum Arsenosum and 2 gm. Potassii Bicarbonas and boil with 10 cc. Aqua Destillata in a small beaker or t.t. until completely dissolved; add enough Aqua Destillata to make the solution when cold measure 97 cc. and then add 3 cc. Tinctura Lavendulae Composita. Filter through paper if necessary.

INCOMPATIBLES—

Liquor Calcis, Ferrum Salts and Magnesium.

BISMUTHUM,-I—Bismuth—Bi.

Pharmaceutical Preparations—

Bismuthi Subcarbonas,-atis, U. S. P.—Bismuth Subcarbonate, $(BiO)_2CO_3.H_2O$.

Bismuthi Subnitras,-atis, U. S. P.—Bismuth Subnitrate, $BiONO_3H_2O$.

Bismuthi Subgallas,-atis.—Bismuth Subgallate—Dermatol.

Suspended in Mucilago is one of the best ways to administer them.

MANGANUM,-I—Manganese—Mn.

Pharmaceutical Preparations—

Mangani Dioxidum,-i, U. S. P.—Manganese Dioxide, MnO_2.

Potassii Permanganas,-atis, U. S. P.—Potassium Permanganate, $KMnO_4$.

Potassii Permanganas acts chiefly as an oxidizer, during which process it loses its color, as is shown by adding an aqueous solution to Alcohol or Acidum Oxalicum solution.

Best administered as pill or tablet with the excipient Kaolin.

Acidum Sulphurosum removes the stains forming Acidum Sulphuricum.

Prescribed with Alcohol, Glycerinum or an Oleum they should be thoroughly triturated together before adding water. Also with Acidum Carbolicum.

FERRUM,-I, U. S. P.—Iron—Fe.

Pharmaceutical Preparations—

Ferrum,-i Reductum,-i, U. S. P.—Reduced Iron.

Ferri Oxidum,-i Hydratum,-i, U. S. P.—Ferric Hydroxide (Hydrate), $Fe_2(OH)_6$.

Ferri Oxidum,-i Hydratum,-i cum Magnesia, U. S. P.—Ferric Hydroxide (Hydrate) with Magnesia—Arsenic Antidote.

Ferri Pyrophosphas,-atis Solubilis, U. S. P.—Soluble Ferric Pyrophosphate.

Ferri Sulphas,–atis, U. S. P. — Ferrous Sulphate—Copperas, $FeSO_4.7H_2O$.

Liquor,–is Ferri et Ammonii Acetatis, U. S. P. — Solution of Iron and Ammonium Acetate—Basham's Mixture.

Massa,–ae Ferri Carbonatis, U. S. P.—Mass of Ferrous Carbonate—Vallet's Mass.

Syrupus,–i Ferri Iodidi, U. S. P.—Syrup of Ferrous Iodide.

Tinctura,–ae Ferri Chloridi, U. S. P. — Tincture of Ferric Chloride.

Prepare Ferri Oxidum Hydratum—

Add 100cc. Tinctura Ferri Chloridi, with constant stirring, to a mixture of 15cc. Aqua Ammonia and 75cc. Aqua Destillata; filter and wash the precipitate thoroughly.

How is this used in Arsenical poisoning? What is the reaction?

Incompatibles—

Acids, acidulous salts, alkalies and their carbonates (general).

Acidum Tannicum and Acidum Gallicum and all vegetable astringents and bitters except Quassia and Calumba.

Ferric salts (if strong solutions) render Mucilago gelatinous.

Acidum Phosphoricum Dilutum will clear up precipitate in mixtures containing Tinctura Digitalis.

Free acid of Tinctura Ferri Chloridi will destroy enamel of the teeth unless diluted 1-9 or more with water.

Liquid mixtures are best taken through a glass tube.

Try Tinctura Ferri Chloridi with solution Sodii Bicarbonas, Liquor Calcis, Acidum Tannicum and Tinctura Digitalis, adding Acidum Phosphoricum Dilutum to the last mixture.

Prescriptions—Write a Compound One.

EXERCISE No. 3.

BITTERS.

Look up difference in action of Simple and Aromatic Bitters in P. Q. C.

CALUMBA,-AE, U. S. P.—Colombo.
EUCALYPTUS,-I, U. S. P.—Eucalyptus.
GENTIANA,-AE, U. S. P.—Gentian.
HYDRASTIS, U. S. P.—Hydrastis—Golden Seal, Yellow-root.
QUASSIA,-AE, U. S. P.—Quassia—Bitter-wood, Bitter-ash.

PHARMACEUTICAL PREPARATIONS—

Extractum,-i Calumbae Fluidum,-i, U. S. P. — Fluid Extract of Calumba.

Tinctura,-ae Calumbae, U. S. P.—Tincture of Calumba.

Extractum,-i Eucalypti Fluidum,-i, U. S. P. — Fluid Extract of Eucalyptus.

Eucalyptol, U. S. P.—Eucalyptol.

Oleum,-i Eucalypti, U. S. P.—Oil of Eucalyptus.

Extractum,-i Gentianae, U. S. P.—Extract of Gentian.

Extractum,-i Gentianae Fluidum,-i, U. S. P.—Fluid Extract of Gentian.

Tinctura,-ae Gentianae Composita,-ae, U. S. P.— Compound Tincture of Gentian.

Extractum,-i Hydrastis Fluidum,-i, U. S. P.— Fluid Extract of Hydrastis.

Glyceritum,-i Hydrastis, U. S. P.—Glycerite of Hydrastis.

Hydrastininae Hydrochloras,-atis, U. S. P.—Hydrastinine Hydrochlorate.

Tinctura,-ae Hydrastis, U. S. P.—Tincture of Hydrastis.

Extractum,-i Quassiae, U. S. P.—Extract of Quassia.

Extractum,-i Quassiae Fluidum,-i, U. S. P.—Fluid Extract of Quassia.

Examine samples of Calumba, Gentiana and Hydrastis roots, Eucalyptus leaves and Quassia wood.

PROPERTIES—

Calumba, Gentiana and Quassia are not astringent bitters; Quassia is the most bitter.

Gentiana is incompatible with Argenti Nitras, Ferrum and Plumbum salts. The Ferrum salts darken the Gentiana coloring matters.

CINCHONA,-AE, U. S. P.

Study Cinchona and its preparations in N. D. and W. & W. See No. 20.

Read article on Tinctura and Percolation in N. D. or S. P. C.

Cinchonism—Read up. Alkaline bromides or Acidum Hydrobromicum Dilutum are the best preventatives.

CINCHONA,-AE. U. S. P.—Cinchona Calisaya—Yellow Cinchona.

PHARMACEUTICAL PREPARATIONS—

Extractum,-i Cinchonae, U. S. P.—Extract of Cinchona.

Tinctura,-ae Cinchonae, U. S. P.—Tincture of Cinchona.

Infusum,-i Cinchonae, U. S. P.—Infusion of Cinchona.

CINCHONA,-AE RUBRA,-AE, U. S. P.—Red Cinchona—Red Peruvian Bark.

PHARMACEUTICAL PREPARATIONS—

Tinctura,-ae Cinchonae Composita,-ae, U. S. P.—Compound Tincture of Cinchona.

INCOMPATIBLES—

Cinchona with Aqua Ammoniae, Liquor Calcis, Gelatina and metallic salts.

Infusum Cinchonae with free Acidum Tannicum.

Tinctura Cinchonae with Aqua, becoming cloudy from precipitation.

Preparations containing the alkaloids in solution, with Iodum, alkalies and their carbonates and the alkaline earths; the first forming insoluble iodides with them and the latter precipitating them from solution.

1. Try Tinctura Ferri Chloridi with a Calumba, a Gentiana, a Quassia, a Hydrastis and a Cinchona preparation each.
2. Try Infusum Cinchonae with Tinctura Iodi.
3. Try Tinctura Cinchonae with Aqua Destillata, Sodii Bicarbonas Solution, Liquor Potassae and Liquor Calcis each.

PRESCRIPTIONS—

Correctives—Preparations of Glycyrrhiza and Eriodictyon disguise the bitter taste. Syrups, especially of Rubus and Rubus Idaeus, are also used. The alkaloidal preparations are easier administered in capsules, but act best when in solution with a little Acidum Sulphuricum Aromaticum as an aid to the solution and the taste.

Write a Prescription.

EXERCISE No. 4.

ALKALIES.

Examine the preparations, noting color, odor and reaction only of the liquids.

AMMONIUM,-I—NH_4.
CALCIUM,-I—Ca.
LITHIUM,-I—Li.
POTASSIUM,-I—K.
SODIUM,-I—Na.

PHARMACEUTICAL PREPARATIONS—

Aqua,-ae Ammoniae, U. S. P.—Ammonia Water, 10% by weight, 0.960 sp. gv.

Aqua,-ae Ammoniae Fortior,-oris, U. S. P.—Stronger Water of Ammonia, 28% by weight. 0.901 sp. gv.

Ammonii Carbonas,-atis, U. S. P.—Ammonium Carbonate, Baker's Ammonia, Hartshorn — $NH_4\ HCO_3NH_4NH_2CO_2$.

Ammonii Chloridum,-i, U. S. P.—Sal Ammoniac, Muriate of Ammonia, NH_4Cl.

Liquor,-is Ammonii Acetatis, U. S. P.—Solution of Ammonium Acetate, Spirit of Mindererus.

Spiritus Ammoniae, U. S. P.—Spirit of Ammonia, Ammoniated Alcohol.

Spiritus Ammoniae Aromaticus, i, U. S. P.—Aromatic Spirit of Ammonia, Sal Volatile.

Calcii Carbonas,-atis Precipitatus,-i, U. S. P.—Precipitated Calcium Carbonate, Creta Praecipitata, $CaCO_3$.

Creta,-ae Preparata,-ae, U. S. P.—Prepared Chalk, $CaCO_3$.

Liquor,-is Calcis, U. S. P.—Solution of Lime, Lime Water.

Lithii Carbonas,-atis, U. S. P.—Lithium Carbonate, Li_2CO_3.

Lithii Citras,-atis, U. S. P.—Lithium Citrate, $Li_3C_6H_5O_7$.

Potassii Acetas,-atis, U. S. P.—Potassium Acetate, $KC_2H_3O_2$.

Potassii Bicarbonas,-atis, U. S. P.—Potassium Bicarbonate, $KHCO_3$.

Potassii Carbonas,-atis, U. S. P.—Potassium Carbonate, Salt of Tartar, K_2CO_3.

Potassii Citras,-atis, U. S. P.—Potassium Citrate, $K_3C_6H_5O_7$. H_2O.

Potassii Nitras,-atis, U. S. P.—Potassium Nitrate, Saltpetre, KNO_3.

Liquor,-is Potassae, U. S. P.—Solution of Potassa, 5%, Potassium Hydroxide (Hydrate.)

Sodii Acetas,-atis, U. S. P.—Sodium Acetate, $NaC_2H_3O_2 \cdot 3H_2O$.

Sodii Bicarbonas, atis, U. S. P.—Sodium Bicarbonate, Baking Soda, $NaHCO_3$.

Sodii Carbonas,-atis, U. S. P.—Sodium Carbonate, Washing Soda, $Na_2CO_3 \cdot 10H_2O$.

Sodii Carbonas,-atis Exsiccatus, i, U. S. P.—Dried Sodium Carbonate, $Na_2CO_3 \cdot 2H_2O$.

Sodii Chloridum,-i, U. S. P.—Sodium Chloride, Table Salt, Common Salt, NaCl.

Prepare Linimentum,-i Ammoniae (Volatile Liniment): Put 35cc. Aqua Ammoniae in a four ounce vial, add 5cc. Alcohol, shake well, and add 60cc. Oleum Olivae or Oleum Gossypii Seminis; shake thoroughly to emulsify.

This may be used alone or as a vehicle for Oleum Terebinthinae or other oils but not for alkaloidal preparations, Chloroformum, Chloral, etc., because of their chemical incompatibility with Aqua Ammoniae.

Add a little of the liniment to a solution of Chloral and heat; note the resulting odor. What occurs?

Incompatibles—Tell what occurs in each case—

Acids, acid salts and alkaloids, hence Tincturae containing alkaloids.

1. Try Sodii Bicarbonas with Acidum Hydrochloricum Dilutum.
2. Try Potassii Acetas with Acidum Hydrochloricum Dilutum.
3. Try Liquor Potassae with Quininae Sulphas solution.
4. Try Bismuthi Subnitras with Sodii Bicarbonas solution.

Liquores decompose the Ammonium preparations and the alkaloids of Belladonna, Hyoscyamus and Stramonium and metallic salts.

5. Try Liquor Potassae with Tinctura Belladonnae and Tinctura Ferri Chloridi each.
6. Try Liquor Ammonii Acetatis with Acidum Hydrochloricum Dilutum, Liquor Potassae (heat) and Plumbi Acetas solution each.
7. Try Creta Preparata with Acidum Hydrochloricum Dilutum and Magnesii Sulphas solution each.

Prescriptions—Write a compound one containing an alkaline preparation.

Note—Alkalies should always be given well diluted, hence in directions for their use order the dose given in a half glass of water. Be careful not to make the bulk of the prescription too large but rather order the dose to be diluted at the time of its administration. Liquid prescriptions should be made in even ounces and not in fractions of an ounce. Preferably as 1, 2, 3, 4, 6 or 8 ounces or their equivalent amounts in the metric system and always require a shake label.

EXERCISE No. 5.

VEGETABLE ACIDS.

ACIDUM,-I ACETICUM,-I, U. S. P.—Acetic Acid.
ACIDUM,-I CITRICUM,-I, U. S. P.—Citric Acid.
ACIDUM,-I TARTARICUM,-I, U. S. P.—Tartaric Acid.

Read up in N. D. and examine their properties.

INCOMPATIBLES—Reasons in each case.

All alkalies chemically but they are synergistic therapeutically.

1. Try Acidum Aceticum with Sodii Bicarbonas solution.
2. Try Acidum Citricum with Potassii Acetas and Potassi Tartras solutions each.
3. Try Acidum Tartaricum with Acidum Tannicum and Plumbi Acetas solutions each and with Liquor Calcis.

SULPHUR, IS, U. S. P.—Sulphur, -S.

PHARMACEUTICAL PREPARATIONS—

Sulphur,-is Sublimatum,-i, U. S. P.—Sublimed Sulphur, Flowers of Sulphur.

Sulphur,-is Lotum, U. S. P.—Washed Sulphur.

Sulphur,-is Praecipitatum,-i, U. S. P.—Precipitated Sulphur, Milk of Sulphur.

Ichthyolum,-i—Ichthyol.

Sodii Hyposulphis,-itis, U. S. P.—Sodium Hyposulphite or Thiosulphate, $Na_2S_2O_3 \cdot 5H_2O$.

Unguentum,-i Sulphuris, U. S. P.—Sulphur Ointment.

PROPERTIES—

Read up preparations, etc., in N. D. and examine the samples.

Which is the usual preparation of Sulphur?

Sulphur Sublimatum contains some free acid and should not be used internally.

PREPARE UNGUENTUM SULPHURIS—

Place 14 gm. Unguentum in a glass mortar or on the pill tile and gradually add 6 gm. Sulphur Lotum, rubbing well together while adding the Sulphur Lotum.

How is Unguentum prepared and what are the advantages of Adeps Benzoinatus?

INCOMPATIBLES—

All oxidizing agents readily forming sulphates; mineral acids, etc.

1. Try Sodii Hyposulphis solution with Acidum Hydrochloricum Dilutum and with Potassii Permanganas solution each.

IODUM,-I, U. S. P.—Iodine,-I.

PHARMACEUTICAL PREPARATIONS—

Iodoformum,-i, U. S. P.—Iodoform, CHI_3.

Iodol—Tetraiodopyrrol, C_4I_4NH.

Liquor,-is Iodi Compositus, -i, U. S. P.—Compound Solution of Iodine, Lugol's Solution.

Tinctura,-ae Iodi, U. S. P.—Tincture of Iodine.

Unguentum,-i Iodi, U. S. P.—Iodine Ointment.

Ammonii Iodidum,-i, U. S. P.—Ammonium Iodide, NH_4I.

Potassii Iodidum,-i, U. S. P.—Potassium Iodide, KI.

Sodii Iodidum,-i, U. S. P.—Sodium Iodide, NaI.

INCOMPATIBLES—

1. Try Tinctura Iodi with Aqua Ammoniae (alkaline hydroxides), Acidum Nitrium (mineral acids), and Sodii Hyposulphis solution (reducing agents) each.

2. Try Liquor Iodi Compositus with Quininae Sulphas (alkaloids) and Plumbi Acetas solutions (mineral salts) each.

3. Make an alcoholic solution of Iodum in a test tube, add to a little Amylum paste in a small dish; Amylum Iodatum is formed and its color is distinctive for the presence of free Iodum.

4. Any alkaline hydroxide or any reducing agent will decolorize Iodum solutions or stains, forming the iodide of the base of the agent used (with other compounds of Iodum), hence colorless solutions of Iodum are no more active than iodide solutions.

   Acidum Carbolicum is one of the best agents in preparing these colorless solutions.

5. Try Potassii Iodidi solution with Bismuthi Subnitras.

6. Why are the iodides incompatible with Spiritus Aetheris Nitrosi, Amylum and Glycyrrhiza preparations?

PRESCRIPTIONS—

Carefully consider the question of incompatibility before and while writing a prescription.

Write a compound prescription containing an Iodum preparation as the base.

Iodum may form explosive compounds with Ammonia, Hydrargyri Oxidum Flavum, Argenti Nitras, Glycerinum and Essentiae. Be careful in prescribing compounds containing Iodum, as it may be freed and form an explosive.

Iodoform odor may be disguised by Oleum Mentha Piperita, Oleum Fennel, Oleum Anisum, Balsamum Peruvianum, Coumarin, etc. Oleum Terebinthinae will remove the odor from vessels.

EXERCISE No. 6.

COLCHICUM,-I, U. S. P.—Colchicum, Meadow-Saffron.

Colchici Radix,-icis, U. S. P.—Colchicum-Root.

Colchici Semen,-inis, U. S. P.—Colchicum-Seed.

Pharmaceutical Preparations—

Vinum,-i, Colchici Radicis, U. S. P.—Wine of Colchicum Root.

Vinum,-i, Colchici Seminis, U. S. P.—Wine of Colchicum Seed.

Colchicina,-ae—Colchicine.

Examine desk samples and look up pharmaceutical preparations.

Prepare Vinum Colchici Radicis—

Place 25gm. Colchici Radix (No. 30 powder) in the large evaporating dish and moisten thoroughly with 25cc. of the menstruum, which consists of 15 parts Alcohol and 85 parts Vinum Album.

Place the percolator in position, suspending from the small ring of the retort stand and placing a small wad of cotton in the lower end.

After the powder has macerated 20-30 minutes put it into the percolator, being careful NOT TO PACK TOO TIGHT, add the menstruum gradually until all has been added, requiring about 65cc. additional and making 60-65cc. of the wine.

Incompatibles—

All vegetable and metallic astringents. Tinctura Iodi and Tinctura Guaiaci.

HYDRARGYRUM,-I, U. S. P.—Mercury—Hg. Quicksilver.

Pharmaceutical Preparations—

Hydrargyri Chloridum,-i Corrosivum,-i, U. S. P.—Corrosive Mercuric Chloride—Bichloride of Mercury, Corrosive Sublimate, Mercuric Chloride—$HgCl_2$

Hydrargyri Chloridum,–i Mite,–is, U. S. P.—Mild Mercurous Chloride—Mercurous Chloride, Subchloride, Calomel—HgCl or Hg_2Cl_2.

Hydrargyri Iodidum, i Flavum,–i, U. S. P.—Yellow Mercurous Iodide—Protoiodide of Mercury—HgI or Hg_2I_2.

Hydrargyri Iodidum,–i Rubrum,–i, U. S. P.—Red Mercuric Iodide—Biniodide—HgI_2.

Hydrargyri Oxidum,–i Flavum,–i, U. S. P.—Yellow Mercuric Oxide—HgO.

Hydrargyri Oxidum,–i Rubrum,–i, U. S. P.—Red Mercuric Oxide—Red Precipitate—HgO.

Hydrargyri Subsulphas,–atis Flavus,–i, U. S. P.—Yellow Mercuric Subsulphate—Basic Mercuric Sulphate, Turpeth Mineral—$Hg(HgO)_2SO_4$.

Hydrargyrum,–i Ammoniatum,–i, U. S. P.—Ammoniated Mercury — White Precipitate, Mercur-ammonium Chloride—NH_2HgCl.

Hydrargyrum,–i Cum Creta, U. S. P.—Mercury with Chalk.

Massa,–ae Hydrargyri, U. S. P.—Mass of Mercury—Blue Mass, Blue Pill.

Unguentum,–i Hydrargyri, U. S. P.—Mercurial Ointment—Blue Ointment.

Ointments of the iodides and oxides are also official.

Examine the chlorides, iodides and oxides.

INCOMPATIBLES—

Almost all preparations, especially with the chlorides.

1. Add to Hydrargyri Chloridum Corrosivum solution a little of each of the following solutions: Acidum Tannicum, Albumen, Argenti Nitras, Potassii Iodidum, Sapo and Sodii Bicarbonas.
2. Add some Hydrargyri Chloridum Mite to Plumbi Acetas solution.
3. Hydrargyri Chloridum Mite with Iodum, chlorides, alkaline earths, alkalies, alkaline carbonates and acids.
4. Hydrargyri cum Creta with acids and acidulous salts.

READ article on Pilulæ in N. D., W. & W., etc.

Place a little Lycopodium or Glycyrrhiza on the pill tile, weigh out 12gr. Massa Hydrargyri and make into six pills, being careful to have the pills of equal size.

AURUM,-I—Gold—Au.

Auri et Sodii Chloridum,-i—Chloride of Gold and Sodium.

GUAIACUM,-I—Guaiac.

Guaiaci Lignum,-i, U. S. P.—Guaiacum-Wood—Lignum vitæ.

Guaiaci Resina,-ae, U. S. P.—Guaiac—Guaiac resin.

Examine desk samples of each.

PHARMACEUTICAL PREPARATIONS—

Tinctura,-ae Guaiaci, U. S. P.—Tincture of Guaiac (Resin).

Tinctura,-ae Guaiaci Ammoniata,-ae, U. S. P.—Ammoniated Tincture of Guaiac.

INCOMPATIBLES—

The Resina is the chief cause.

1. Add Acidum Hydrochloricum Dilutum, Aqua Destillata and Spiritus Aetheris Nitrosi each to separate portions of Tinctura Guaiaci.

PRESCRIPTIONS—

Write a compound one.

REMEMBER that size of dose depends upon age of the patient, strength of the drugs used, stage and character of sickness, frequency of administration, idiosyncrasies of the patient, etc.

WRITE the Superscription first, then that part of the Inscription consisting of the names of the drugs (regarding their incompatibles closely), then the Subscription and the Signature. Knowing the frequency and number of the doses determine the size and then the product of the size of the dose (of the individual preparations) by their number gives the amount of each ingredient to be put into the mixture.

EXERCISE No. 7.

SARSAPARILLA,–AE, U. S. P.—Sarsaparilla (root).

Examine the desk sample of the root. Look up its official description (N. D.)

PREPARE SYRUPUS–I SARSAPARILLAE COMPOSITUS–I, U. S. P.—

Pour 12cc. Extractum Sarsaparillae Fluidum, .1cc. Extractum Glycyrrhizae Fluidum, .1cc. Extractum Sennae Fluidum (.1cc. equals 2 minims) into a graduate; add to them a *small* drop of each of the following oils: Oleum Anisum, Oleum Gaultheriae and Oleum Sassafras, and mix thoroughly; then add enough Aqua Destillata to make the volume up to 37.5cc. and mix well. Set aside for an hour and then filter or strain through a cloth into a beaker and dissolve 40 gm. Saccharum in the filtrate by aid of gentle heat; cool, strain and add Aqua Destillata to make 62.5cc. Mix thoroughly. Wash cloth and return to the desk.

NOTE.—The chief use of the compound decoction or syrup is as a vehicle or menstruum for preparations of Iodum or Hydrargyrum, though it is chemically incompatible with Iodum because of its Amylum constituents.

INCOMPATIBLES—

Alkalies favor the decomposition of its preparations.

VEGETABLE ASTRINGENTS.

Acidum,–i Gallicum,–i, U. S. P.—Gallic Acid—$C_6H_2(OH)_3.COOH+H_2O$.

Acidum, -i Tannicum, -i, U. S. P.—Tannic Acid—Tannin—Digallic Acid.

Read up preparation of each in N. D. and examine samples.

INCOMPATIBLES—

Reasons for and results in each case.

1. Try solutions of Acidum Gallicum and Acidum Tannicum each with each of the following: Tinctura Ferri Chloridi, noting results and heating; Gelatina; Plumbi Acetas solution; Liquor Potassae; Ferri Sulphas solution (which reacts); Quininae Sulphas solution and Acidum Sulphuricum Dilutum (mineral acids).

METALLIC ASTRINGENTS.

Argenti Nitras, -atis, U. S. P.—Silver Nitrate—$AgNO_3$.
Argenti Nitras Dilutus, U. S. P.
Argenti Nitras Fusus, U. S. P.

Cupri Sulphas, -atis, U. S. P.—Copper Sulphate—Blue Vitriol—$CuSO_45H_2O$.

Examine Argenti Nitras and Cupri Sulphas and read up their preparation.

INCOMPATIBLES—

1. Try solution of each with each of the following: Acidum Tannicum solution; Potassii Iodidum solution; Sodii Bicarbonas solution; Sodii Chloridum solution.
2. Why use Aqua Destillata for Argenti Nitras solutions?

PROPERTIES—

Argentum stains can be removed by solutions of Potassii Cyanidum, Sodii Hyposulphis or Tinctura Iodi.

Describe the characteristic reaction or chemical test for the presence of a salt of Argentum. What use is made of this reaction?

Prescriptions—

John Jones. July 9th, 1897.

℞ Potassii Iodidi..... 6.00
Syrupi Sarsaparillae Compositi..... 60.00
Aquae Destillatae, q. s. ad.....128.00
Misce. Fiat solutio. (Note.)
Signa.—Shake well. Take a dessertspoonful every six hours.

....M. D.

Note.—Dissolve the Potassii Iodidum in a little Aqua Destillata, add the Syrupus Sarsaparillae Compositus and then Aqua Destillata to the required amount.

Would the above prescription be compatible if Liquor Potassae 6cc. were to be added?

EXERCISE No. 8.

METALLIC ASTRINGENTS.

PLUMBUM–I AND ZINCUM–I PREPARATIONS—

Plumbi Acetas,–atis, U. S. P.—Lead Acetate—Sugar of Lead—$Pb(C_2H_3O_2)_2 3H_2O$.

Zinci Oxidum,–i, U. S. P.—Zinc Oxide—ZnO.

Zinci Sulphas,–atis, U. S. P.—Zinc Sulphate—White Vitriol—$ZnSO_4 . 7H_2O$.

Examine the three above preparations.

INCOMPATIBLES—

Use solutions of Plumbi Acetas and Zinci Sulphas.

1. Try each with Acidum Hydrochloricum Dilutum; Albumen solution; Liquor Potassae; Potassii Iodidum solution; Sodii Bicarbonas solution; hard water.
2. Try with each other. What is the advantage of this mixture?
3. What results when Plumbum and Opium preparations are combined (W. & W.)?

ALUMEN,–INIS, U. S. P.—Alum, Potassium Alum.

What is the chemical structure of the official Alumen?

Why is the term Alum used when the compounds contain no Aluminum?

Read up the subject in the N. D.

1. Add Liquor Potassae to Alumen solution and heat and if it is the Ammonium Alum Ammonia gas will be evolved and this can be tested by holding a piece of moistened red litmus paper over the top of the t. t. used. Try this test.

INCOMPATIBLES—

Alkalies; Calcium, Ferrum, Hydrargyrum and Plumbum salts; Tartrates; vegetable astringents and Albumen.

How is Alumen Exsiccatum prepared?

WHAT causes the white coating on Alumen when exposed to the air?

NUX,-CIS VOMICA,-AE, U. S. P.—Nux Vomica, Poison Nut.

PHARMACEUTICAL PREPARATIONS—

Extractum,-i Nucis Vomicae, U. S. P.—Extract of Nux Vomica.

Extractum,-i Nucis Vomicae Fluidum,-i, U. S. P.—Fluid Extract of Nux Vomica.

Tinctura,-ae Nucis Vomicae, U. S. P.—Tincture of Nux Vomica.

Strychninae Sulphas,-atis, U. S. P.—Strychnine Sulphate.

Brucina,-ae—Brucine.

Read up in N. D. and examine preparations.

INCOMPATIBLES—

1. Chemically with solutions of Bromides, Chlorides and Iodides and the tannins. Why is this the case?
2. Try Tinctura Nucis Vomicae with Potassii Iodidum solution.
3. Physiologically with Chloral, Chloroformum, Aether, Tabacum, etc. Why?

PROPERTIES—

How would Strychnina and Acidum Salicylicum be differentiated physically and chemically? Try each with Tinctura Ferri Chloridi.

IGNATIA,-AE—Strychnos Ignatia.

Examine desk sample of Strychnos Ignatia.

PRESCRIPTIONS—

Write one containing Nux Vomica in pills or capsules for a case of heart trouble. (W. & W.)

Compound the following:

JOHN DOE. (Dyspepsia.) July 11th, 1897.

℞ Tincturae Nucis Vomicae..... 6.50
Acidi Hydrochlorici Diluti 4.50
Tincturae Gentianae..... 54.00
Misce.
Signa.—Shake well. Take a teaspoonful in half a glass of water after each meal.

NOTE—Why should Potassii Bromidum not be added to the above prescription?

Quiz Follows this Exercise.

EXERCISE No. 9.

DIGITALIS, U. S. P.—Digitalis—Foxglove Leaves.

Pharmaceutical Preparations—

Extractum,-i Digitalis, U. S. P.—Extract of Digitalis.

Extractum,-i Digitalis Fluidum,-i, U. S. P.—Fluid Extract of Digitalis.

Infusum,-i Digitalis, U. S. P.—Infusion of Digitalis.

Tinctura,-ae Digitalis, U. S. P.—Tincture of Digitalis.

Examine desk sample of Digitalis and Tinctura Digitalis.

Prepare Infusum Digitalis—

Weigh out 1.5 gm. Digitalis leaves, bruise or break them, put into a beaker, pour 50cc. boiling Aqua Destillata on them and allow to macerate until cold. Strain through a cloth and add 10cc. Alcohol and 15cc. Aqua Cinnamomi to the strained liquid and then pass enough Aqua Destillata through the strainer to make 100cc. Replace washed cloth in desk.

How do Infusi and Decocti differ?

Incompatibles—

Chemical—Cinchona preparations, Plumbi Acetas, Ferri Sulphas, Tinctura Ferri Chloridi.

Physiological—Acidum Tannicum, Aconitum (for rapid action), Lobelia, Opium (for long continued action), Saponin and Senegin.

Cold, Belladonna and Ergota are synergistics.

1. Try Tinctura Digitalis with Tinctura Ferri Chloridi. What will make this clear?
2. Try Infusum Digitalis with Acidum Tannicum and Plumbi Acetas solutions each.

PROPERTIES—

Explain possible cumulative action of Digitalis.

Best not mixed with mineral acids or in a syrupy or aqueous menstruum.

Contains Glucosides but no Alkaloidal constituents. How do these differ?

Digitalis has better general action; Infusum Digitalis is best preparation in kidney troubles; Tinctura Digitalis is best preparation in cardiac troubles.

ERGOTA, AE, U. S. P.—Ergot—Spurred Rye.

PHARMACEUTICAL PREPARATIONS—

Extractum, i Ergotae, U. S. P.—Extract of Ergot.

Extractum,-i Ergotae Fluidum,-i, U. S. P.—Fluid Extract of Ergot.

Ergotinum—Ergotine.

Examine desk sample of Ergota and look up official description.

INCOMPATIBLES—

Chemically with caustic alkalies and metallic salts; try Liquor Potassae and Plumbi Acetas solution with Extractum Ergotae Fluidum.

Physiologically with Amylum Nitris, Aconitum, Lobelia, Tabacum and Veratrum Viride on the circulation.

Belladonna, Digitalis, cold and electricity increase effects on circulation.

Borax, Gossypium, Rue, Sabina, etc., increase parturient actions.

PROPERTIES—

Ammonia is the best solvent for the active principle.

Aqua Chloroformi may be used as a corrective for the taste.

Hypodermically if rapid action is desired.

Ergota is rarely of any value if over a year old, and powdered Ergota if over a few months old, as the oil becomes rancid.

Contains an oil, a resin, acids, phosphates and alkaloids.

Acidum Phosphoricum Dilutum should be used when prescribed with Tinctura Ferri Chloridi? Why?

PRESCRIPTIONS—

1. Write a compound one.
2. Criticise the following:

RICHARD ROE. June 2, 1897.

℞ Extracti Digitalis ..... o | 06
Extracti Gentianae ..... 2 | 40
Glyceriti Amyli, q. s.

M.—Fiant pilulae No. VI.

S.—Take one every six hours until desired effect.

NOTE.—Triturate well together in a mortar and divide into six pills of equal size on the pill tile.

Transpose the amounts of the above prescription into the Apothecary system.

Quiz Follows this Exercise.

EXERCISE No. 10.

CIMICIFUGA,-AE, U. S. P.—Cimicifuga—Black Snakeroot, Black Cohosh.
SCILLA,-AE, U. S. P.—Squill; Squills.
STROPHANTUS,-I, U. S. P.—Strophanthus.

PHARMACEUTICAL PREPARATIONS—

Extractum,-i Cimicifugae, U. S. P.—Extract of Cimicifuga.
Extractum,-i Cimicifuga Fluidum, U. S. P.—Fluid extract of Cimicifuga.
Tinctura,-ae Cimicifugae, U. S. P.—Tincture of Cimicifuga.
Acetum,-i Scillae, U. S. P.—Vinegar of Squill.
Extractum,-i, Scillae Fluidum,-i, U. S. P.—Fluid Extract of Squill.
Syrupus,-i Scillae, U. S. P.—Syrup of Squill.
Syrupus,-i Scillae Compositus,-i, U. S. P.—Compound Syrup of Squill—Coxe's Hive Syrup, Hive Syrup.
Tinctura,-ae Strophanthi, U. S. P.—Tincture of Strophanthus.

Examine desk samples of Cimicifuga and Scilla and also the Extractum Scillae Fluidum and Tinctura Strophanthi.

PREPARE SYRUPUS SCILLAE—

Heat 11cc. Acetum Scillae to the boiling point in a beaker and filter while hot. Dissolve 20gm. Saccharum in the hot filtrate by agitation and without further heating strain through a cloth and when cold add enough Aqua Destillata through the strainer to make 25cc. Mix thoroughly and keep for use in prescription No. 3 below. Return washed cloth to the desk. (Yellow Acetum Scillae is the official, the Red being from the red root.)

How do Aceti, Tincturae and Vini differ? (N. D., S. P. C. or W. & W.)

Do the preparations of this excercise contain alkaloids? If so, name them.

INCOMPATIBLES—

Cimicifuga:—Therapeutically with all stimulants. Give reasons in each of the following: Tinctura Cimicifugae with Aqua Destillata, Acidum Hydrochloricum Dilutum and Tinctura Ferri Chloridi each.

Scilla:—1. Try Acetum Scillae with Liquor Potassae.

2. Try Extractum Scillae Fluidum with Plumbi Acetas solution.

3. Try Syrupus Scillae with Ammonii Carbonas solution.

PRESCRIPTIONS—

1. Write a compound one.

2. Write the corrected form in full of the following prescription, using the Apothecary equivalents:

JOHN SMITH. May 6th, 1897.

℞ Tincture Digitali..... 6.00
Extractu Ergot Flu..... 10.00
Aq. Cinnamomae..... 32.00
Mis.—Fiat mixture.
Sig.—Take a teaspoonful.
....M. D.

3. Compound the following:

JOHN JONES. (Bronchial cold.) Feb. 6th, 1897.

℞ Potassii Bromidi..... 5.00
Syrupi Scillae..... 25.00
Syrupi Sarsaparillae Compositi..... 20.00
Aquae Chloroformi q. s. ad..... 65.00
Misce.—Fiat mistura.
Signa.—Shake well and take a teaspoonful every four hours.
.....M. D.

4. Compound the following:

JOHN THOMAS. Jan. 12th, 1897.

(Cold, general.)

℞ Quininae Sulphatis.....gr. xv
Ammonii Chloridi.....gr. x
Capsici Pulveris.....gr. j
M.—Fiant capsulae no. vj.
S.—Take one every three hours.
.....M. D.

NOTE—Weigh out each ingredient in No. 4; triturate them well together in the mortar; divide into six equal masses on the pill tile and fill the capsules if desiring to fill them dry. May add Glycerinum (6-10gtt.) to the entire mass on the pill tile, mixing carefully with the steel spatula until the mass will adhere together, then roll into a small cylinder and cut into six equal masses; then put into the capsules. May use Mucilago.

Quiz Follows the Exercise.

EXERCISE No. 11.

BELLADONNAE FOLIA,-AE, U. S. P.—Belladonna Leaves—Deadly Nightshade.
BELLADONNAE RADIX,-ICIS, U. S. P.—Belladonna Root.
HYOSCYAMUS,-I, U. S. P.—Hyoscyamus—Henbane.
STRAMONII FOLIA,-AE, U S. P.—Stramonium Leaves.
STRAMONII SEMEN,-INIS, U. S. P.—Stramonium Seed.

PHARMACEUTICAL PREPARATIONS—

Extractum,-i Belladonnae Foliorum Alcoholicum,-i, U. S. P.—Alcoholic Extract of Belladonna Leaves.

Extractum,-i Belladonnae Radicis Fluidum,-i, U. S. P.—Fluid Extract of Belladonna Root.

Linimentum,-i Belladonnae, U. S. P.—Belladonna Liniment.

Tinctura,-ae Belladonnae Foliorum, U. S. P.—Tincture of Belladonna Leaves.

Unguentum,-i Belladonnae, U. S. P.—Belladonna Ointment.

Atropinae Sulphas,-atis, U. S. P.—Atropine Sulphate.

Extractum,-i Hyoscyami, U. S. P.—Extract of Hyoscyamus.

Extractum,-i Hyoscyami Fluidum,-i, U. S. P.—Fluid Extract of Hyoscyamus.

Tinctura,-ae Hyoscyami, U. S. P.—Tincture of Hyoscyamus.

Hyoscinae Hydrobromas,-atis, U. S. P.—Hyoscine Hydrobromate.

Hyoscyaminae Hydrobromas,-atis, U. S. P.—Hyoscyamine Hydrobromate.

Extractum,-i Stramonii Seminis, U. S. P.—Extract of Stramonium Seed.

Extractum,-i Stramonii Seminis Fluidum, i, U. S. P.—Fluid Extract of Stramonium Seed.

Tinctura, ae Stramonii Seminis, U. S. P.—Tincture of Stramonium Seed.

Examine desk samples of each of the above drugs and their preparations.

INCOMPATIBLES—

1. Caustic alkalies decompose the alkaloidal principles evolving Ammonia. Add Liquor Potassa to Tinctura Belladonnae Foliorum in a t. t., place a strip of moistened red litmus paper over the top of the t. t. and apply heat to the bottom of the tube. Is Ammonia evolved? Note what change if any occurs.
2. Mineral Acids:—Add Acidum Nitricum Dilutum to Tinctura Belladonnae Foliorum.
3. Metallic Salts:—Add Plumbi Acetas solution to Tinctura Hyoscyami.
4. Vegetable Acids:—Add Acidum Tannicum solution to Tinctura Hyoscyami.
5. Therapeutical:—Aconitum; Quinina; Opium to their action on the respiration; Pilocarpus and Physostigma almost completely.

PRESCRIPTIONS—

1. Write the correct form in full of the following:

WILL HARRIS. January 23d, 1897.

℞ Ext. Stram..... 6.00
Tin. Hyosca..... 9.00
Liq. Potass..... oz. ss.
Aqua Cin..... dr. 36.
Mis. Sig.—Take 1 dr. every 20 minutes.
.....M. D.

2. Write the correct form in full of the following:

J. B. BILLS. March 12th, 1897.

℞ Pot. Iod..... 8.00
Tinc. Iod..... M. 60
Liq. Am. Acet..... oz. ij.
Aq. ad.....128.00
Misce.—Signa.—Take a dessertspoonful after meals.

NOTE.—Are the two above prescriptions compatible? If they are not, give the incompatible ingredients in each, and the reasons.

3. Write a compound prescription.

Quiz Will Follow this Exercise.

EXERCISE No. 12.

CAMPHORA,-AE, U. S. P.—Camphor.
CANNABIS INDICA,-AE, U. S. P.—Indian Cannabis-Hemp, Indian Hemp.
THEOBROMA,-ATIS.—Cacao.
VALERIANA,-AE, U. S. P.—Valerian.

Examine desk samples.

PHARMACEUTICAL PREPARATIONS—

Aqua,-ae Camphorae, U. S. P.—Camphor Water.
Linimentum,-i Camphorae, U. S. P.—Camphor Liniment.
Linimentum,-i Saponis, U. S. P.—Soap Liniment.
Spiritus Camphorae, U. S. P.—Spirit of Camphor.
Camphora,-ae Monobromata,-ae. U. S. P.—Monobromated Camphor.
Extractum,-i Cannabis Indicae, U. S P.—Extract of Cannabis Indica.
Extractum,-i Cannabis Indicae Fluidum,-i, U. S. P.—Fluid Extract of Cannabis Indica.
Tinctura,-ae Cannabis Indicae, U. S. P.—Tincture of Cannabis Indica.
Oleum,-i Theobromatis, U. S. P.—Oil of Theobroma—Butter of Cacao.
Extractum,-i Valerianae Fluidum,-i, U. S. P.—Fluid Extract of Valerian.
Tinctura,-ae Valerianae. U. S. P.—Tincture of Valerian.
Tinctura,-ae Valerianae Ammoniata,-ae, U. S. P.—Ammoniated Tincture of Valerian.

INCOMPATIBLES—

Camphora:—1. Solutions, physically, with Aqua, unless it has been dissolved by trituration in milk. Try Spiritus Camphorae with Aqua Destillata.

2. Alkalies and earthy salts precipitate the small amount soluble in Aqua.

Cannabis Indica:—1. Try Tinctura Cannabis Indicae with Aqua Destillata and Liquor Potassae each. What results and why in each case?

Theobroma:—Shake a small piece of Oleum Theobromatis in a test tube with cold water, then apply heat and note the change; add Liquor Potassae 20–30 M. and shake while heating to boiling and note the change. (Illustrates the saponifying action and emulsifying power of caustic alkalies on fixed oils, and is used in cleaning oily vessels and apparatus.)

Valeriana:—1. Try Tinctura Valerianae with Acidum Sulphuricum Dilutum and solutions of Plumbi Acetas and Sodii Bicarbonas each.

PROPERTIES AND USES—

Camphora:—Freely soluble in Alcohol, Aether, Benzinum, Chloroformum and fixed and volatile oils.

The alcoholic and etherial solutions render Hydrargyri Chloridum Corrosivum more soluble.

Triturated with Chloral, Menthol or Thymol and resins it liquefies.

Cannabis Indica:—Antagonized by Strychnina, caustic alkalies and lemons. The Tinctura suspended in Mucilago may be given in Aqua and the taste covered by Spiritus Chloroformi.

Theobroma:—Chief use is in manufacture of Suppositoriae.

Valeriana:—Aqua Cinnamomi is the best corrective for the taste.

The Extractum Fluidum and Tinctura are very nauseous and bulky.

Oleum Valerianae (unofficial) is best given in Mucilago with Aqua Cinnamomi.

Valerianates are made with an acid produced from Alcohol Amylicum and represents the actions of the bases rather than the plant or acids.

Look up Emulsa and Sapo. (N. D., S. P. C. or W. & W.)

PRESCRIPTIONS—

1. Compound the following:

JOHN JACKSON. December 21st, 1897.

℞ Spiritus Camphorae .....
Aquae Ammoniae.....aa 15.00
Olei Olivae 34.00
Mis.—Fiat emulsa.
Sig.—Shake thoroughly and apply to the part every two hours.
.....M. D.

2. Write a compound prescription.

Quiz Will Follow this Exercise.

EXERCISE No. 13.

COCA,-AE, U. S. P.—Coca-Erythroxylon—Coca Leaves.

PHARMACEUTICAL PREPARATIONS—

Cocaine Hydrochloras,-atis, U. S. P.—Cocaine Hydrochlorate.

Extractum,-i Cocae Fluidum-i, U. S. P.—Fluid Extract of Coca.

Vinum,-i Cocae (Erythroxylon), N. F.—Wine of Coca.

Examine desk sample of Cocae Folia and Extractum Cocae Fluidum.

INCOMPATIBLES—

1. Why should Coca preparations not be prescribed with Acidum Tannicum, Liquor Potassae, Mayer's Reagent or Sodii Bicarbonas?
2. Why not with Aether, Alcohol, Amyl Nitras, Chloral, Chloroformum, Morphina, or Opium?
3. Cocainae Hydrochloras solution added to Argenti Nitras solution and then Acidum Nitricum added, forms Cocainae Nitras, but this mixture is prescribed for local uses because the painful effect of the caustic action of the Argenti Nitras is decreased.

CAFFEINA,-AE, U. S. P.—Caffeine—Theine—Guaranine.

PHARMACEUTICAL PREPARATIONS—

Caffeina,-ae Citrata,-ae, U. S. P.—Citrated Caffeine.

Caffeina,-ae Citrata,-ae Effervescens.-tis. U. S. P.—Effervescent Citrated Caffeine.

INCOMPATIBLES—

Try Caffeina Citrata with Liquor Potassae and Potassii Iodidum solution each.

USES—

Addition of Sodii Benzoas or Salicylas makes them more soluble.

ALCOHOLS.

Alcohol, U. S. P.—Alcohol, Ethyl Alcohol, Rectified Spirits—C_2H_5OH.

PROPERTIES—Examine them.

1. Taste.
2. Miscibility with Aqua without cloudiness.
3. Burns with a blue flame.
4. Has no action on litmus paper previously moistened with Aqua Destillata.
5. Leaves no residue on evaporation.
6. Has no odor of fusil oil upon evaporating spontaneously from filter paper.
7. Mixed with half its volume of Liquor Potassae it should not at once become dark colored (absence of Alcohol Methylicum, Aldehyde or oak tannin.)
8. More than faint opalescence or darkening after standing six hours when mixed with a few drops of Argenti Nitras solution in a t. t. shows traces of organic matters, Alcohol Amylicum, etc.
9. Evaporate 10cc. to 2cc. and add 2cc. Acidum Sulphuricum, and if Alcohol Amylicum is present a red color will be produced.

PHARMACEUTICAL PREPARATIONS—

Alcohol, U. S. P.—Alcohol, 91% by weight, 94% by volume—sp. gv. 0.820 at 15° C.

Alcohol Absolutum,-i, U. S. P.—Absolute Alcohol—99% pure—sp. gv. 0.797 at 15° C.

Alcohol Deodoratum,-i, U. S. P.—Deodorized Alcohol—92% by weight, 95.5% by volume—sp. gv. 0.816 at 15° C.

Alcohol Dilutum,-i, U. S. P.—Diluted Alcohol—41% by weight, 48.6% by volume—sp. gv. 0.936 at 15° C.

Spiritus Frumenti, U. S. P.—Whiskey—44–50% by weight of Alcohol—sp. gv. 0.930.

Spiritus Vini Gallici, U. S. P.—Brandy—39–47% Alcohol by weight—sp. gv. 0.941.

Vinum,-i Album,-i, U. S. P.—White Wine—10–14% Alcohol by weight—sp. gv. 0.990.

Vinum,-i Rubrum,-i, U. S. P.—Red Wine—10–14% Alcohol by weight—sp. gv. 0.989.

Rules for Making Alcohols of Lower Percentages, U. S. P.—

V=volume % and *W*=weight % of the strong Alcohol to be used.

v=volume % and *w*=weight % of the Alcohol to be made.

1. Mix *v* volumes of the strong Alcohol with Aqua Destillata enough to make *V* volumes of the product. Allow to stand until full contraction has taken place and then make *V* volumes by adding more Aqua Destillata.
2. Mix *w* parts by weight of the strong Alcohol with Aqua Destillata enough to make *W* parts by weight of the product.

Count the number of drops (gtt.) in a fluid drachm of Alcohol, using the medicine dropper, and then compare with those from the small graduate.

The size of a drop depends upon the consistency of the liquid, hence its composition, temperature, sp. gv. must be considered. The size and shape of the surface from which it is dropped also modifies the size of the drop.

Compare the capacity of the teaspoons, dessertspoons and tablespoons furnished with those furnished the others of the class and with your graduates. This comparison should teach you to inspect the capacity of the spoons to be used in the administration of your prescriptions and to prefer a graduated medicine glass.

Alcohol Amylicum,-i—Amyl Alcohol—Fusil Oil—$C_5H_{11}OH$.

Alcohol Methylicum,-i — Methyl Alcohol — Wood Alcohol — CH_3OH.

Prescriptions—

Write a compound one.

Quiz Will Follow this Exercise.

EXERCISE No. 14.

AETHER,-IS, U. S. P.—Ether—Sulphuric Ether—$(C_2H_5)_2O$.
CHLOROFORMUM,-I, U. S. P.—Chloroform—$CHCl_3$.

Pharmaceutical Preparations—

Aether,-is, U. S. P.—Ether—sp. gv. 0.725 to 0.728 at 15° C.
Spiritus Aetheris, U. S. P.—Spirit of Ether.
Aetheris Compositus,-i, U. S. P.—Compound Spirit of Ether—Hoffman's Anodyne.
Aqua,-ae Chloroformi, U. S. P.—Chloroform Water.
Emulsum,-i Chloroformi. U. S. P.—Emulsion of Chloroform.
Linimentum,-i Chloroformi, U. S. P.—Chloroform Liniment.
Spiritus Chloroformi, U. S. P.—Spirit of Chloroform.

Properties—Examine sample of each as follows:

Aether—

1. Physical properties, as color, odor, taste, etc.
2. Volatility, producing cold by evaporation on the hand.
3. Easy ignition, requiring careful handling in the vicinity of a flame, as the vapor when mixed with large volumes of air and ignited explodes violently.
4. Lack of miscibility with water.
5. Neutral to litmus paper, but becomes acid upon standing for a long time in a partially filled bottle, owing to the formation of Acidum Aceticum.
6. Shaken occasionally, during an hour, with .1 its volume of Liquor Potassae, it should not develop color, showing absence of Aldehyde.
7. No residue upon evaporation.

Chloroformum—

Examine as with Aether, noting the differences.

Test the number of gtt. per drachm of each.

Why is Aether sometimes called Sulphuric Aether?

What would be indicated by the formation of a white precipitate upon the addition of Argenti Nitras solution to some Chloroformum?

CHLORAL,—IS, U. S. P.—Chloral—Chloral hydrate—Trichloraldehyde—$C_2HCl_3O.H_2O$.

Read up preparation, official description and properties in N. D.

PROPERTIES—Examine them.

1. Physical.
2. Liquefies when triturated with equal parts of Acidum Carbolicum and many of its derivatives, Camphora, Menthol and Thymol; try with Menthol.
3. Decomposed by caustic alkalies, alkaline earths and Ammonia, forming Chloroformum and a formate; try with Liquor Potassae.
4. Aqueous and alcoholic solutions are neutral, but the aqueous solutions gradually become acid; why this change? Remember if using an old solution.
5. Add Argenti Nitras solution to some Chloral solution acidified with Acidum Dilutum. Why add the Acid and why apply this test?

PRESCRIPTIONS—

1. Write a compound prescription.
2. Give reasons for and against compound prescriptions.
3. Why should not the three following mixtures be made?

a—Ammonii Carbonas and Syrupus Scillae.

b—Syrupus Ferri Iodidi and Tinctura Cinchonae.

c—Sodii Salicylas, Quininae Sulphas and Acidum Sulphuricum Aromaticum.

4. Compound the following prescription:

JOHN THOMPSON. July 9th, 1897.

℞ Chloralis 2.00
Potassii Bromidi 5.00
Tincturae Hyoscyami 20.00
Aquae Chloroformi q. s. ad 65.00

Misce.—Fiat solutio.

Signa.—Shake well and take a teaspoonful every hour until quiet.

.....M. D.

Quiz Will Follow this Exercise.

EXERCISE No. 15.

PREPARATIONS AND THEIR PRESCRIBING.

Look up definition and preparation of each class in W. & W. and N. D.

Aceta:—What constituent governs their chemical incompatibility? They may be prescribed in aqueous, alcoholic, or syrupy liquids.

1. Acetum Scillae and Sodii Bicarbonas solution.
2. Acetum Opii and Liquor Potassae.

Aquae:—Usually solvents or vehicles, having no medicinal dose themselves. Aromatic waters should not be used for saturated solutions, being already saturated with a volatile oil, and milky mixtures result. Aqua Destillata preferable, as solids of natural waters may precipitate medicinal ingredients.

1. Aqua Cinnamomi with Sodii Bicarbonas (solid). No precipitate unless very strong of $HNaCO_3$.
2. Aqua and Argenti Nitras solution.

Cachetae.

Capsulae:—Compound the following, giving reasons for wet or dry:

℞ Quininae Sulphatis ..... gr. x
Ammonii Chloridi ..... gr. xxv
Sodii Salicylatis ..... gr. xx
Misce.—Fiant capsulae No. X.
Signa.—Take one every two hours.

Cataplasmata:—Mix 2 dr. flaxseed meal in an evaporating dish with enough boiling water to make a paste; then 2 dr. ground mustard in another dish with enough tepid water to make a paste; then mix the two thoroughly and spread with a spatula on the cloth furnished, folding the cloth so that it covers the poultice. Flour, white of egg, etc., are used to prevent blistering.

Cerata.

Chartae—Charta Potassii Nitratis:—Dissolve Potassii Nitras gm. 1 in Aqua Destillata cc. 4; dip strip of filter paper into solution, dry, burn, and inhale.

Collodia.

Confectiones:—Method of administering disagreeable medicines.

Decocta:—Readily decompose, hence prepare fresh when desired. Strength of energetic drugs should be prescribed by a physician.

Elixiria:—Good correctives or vehicles for tinctures unless resinous.

Emplastra.

Emulsa:—Acacia, yolk of egg, Potassa, Pancreatinum, etc., are used. Egg emulsions soon decompose. Acids break up alkali emulsions.

Alcoholic liquids precipitate egg and gum emulsions. Should be freely miscible with water. Cracked when the oil separates. Fixed oils take acacia 1–2 dr. per oz. of oil.

℞ Olei Morrhuae.....oz. j
Acaciae.....dr. ij
Aquae q. s. ad.....oz. iv
Misce.—Fiat Emulsum.
Signa.—Take a teaspoonful every four hours.

Note.—Triturate Acacia in a mortar with water until it crackels, then add the oil, triturating thoroughly, and then water enough to make 4 oz.

1. Test a dr. with Alcohol. Not so good as Continental method.
2. Triturate the oil and acacia until a smooth mixture, add at once twice as much water as acacia and triturate to perfect white emulsion, as shown by crackling; add diluent with trituration.

Enemata.

Extracta:—Pilular consistency; powdered are not reliable, because of heat. Glycerinum is added to some to keep soft. Aqueous and alcoholic according to the solvent used. Especially adapted to pills or capsules, those of little medicinal value as excipients. Dose small and needs no excipients.

Extracta Fluida:—Small dose; reliable strength. Alcohol, water and glycerine menstruums. Resinous are precipitated by water. Good vehicles for them are aromatic elixirs, syrups, spirits or fluid extracts.

Glycerita:—Glyceritum Amyli. Mix the water and glycerine and add the starch in the small evaporating dish, stirring until a homogeneous mixture; then apply heat gradually (not above 144° C.), stirring constantly until a translucent jelly. Allow to cool. Keep for pill excipients.

℞ Amyli 1.00
Aquae 1.00
Glycerini 8.00
Misce.—Fiat glyceritum.
Signa.—Use as pill excipient.

Quiz Will Follow this Exercise.

EXERCISE No. 16.

OPIUM,-I, U. S. P.—Opium.

Read N. D. article on Opium, noting carefully the official forms, origin and production, description, adulterations, examination, constituents, morphiometry, pharmaceutical preparations and their action and uses.

Read carefully symptoms and treatment of Opium poisoning in your text books.

Pharmaceutical Preparations—

Opium,-i, U. S. P.—Opium—9% of Morphina.

Opium,-i Pulvis,-eris, U. S. P.—Powdered Opium—No. 80 powder—13% of Morphina.

Opium,-i Deodoratum,-i, U. S. P.—Deodorized (Denarcotized) Opium—13-15% Morphina.

Extractum,-i Opii, U. S. P.—Extract of Opium.

Pilulae,-arum Opii, U. S. P.—Pills of Opium.

Pulvis,-eris Ipecacuanhae et Opii, U. S. P.—Powdered Ipecac and Opium—Dover's Powder.

Tinctura,-ae Opii, U. S. P.—Tincture of Opium—Laudanum.

Tinctura,-ae Opii Camphorata,-ae, U. S. P.—Camphorated Tincture of Opium—Paregoric.

Tinctura,-ae Opii Deodorati, U. S. P.—Tincture of Deodorized Opium.

Mistura,-ae Glycyrrhizae Composita,-ae, U. S. P.—Compound Mixture of Glycyrrhiza—Brown's Mixture.

Examine desk sample of the capsule, Pulvis Ipecacuanhae et Opii, Tinctura Opii, and Tinctura Opii Camphorata.

Incompatibles—Try with Tinctura Opii.

1. Ferric Chloride gives a deep red color due to the Meconic Acid.
2. Metallic salts precipitate the meconates, sulphates and coloring matters. Use Argenti Nitras and Plumbi Acetas solutions.
3. All Tannin bearing preparations precipitate Codeine Tannate. Use Acidum Tannicum solution.
4. Ammonia, fixed alkalies and their carbonates precipitate the alkaloids. Use Liquor Potassae.
5. Its glucose constituent may cause an explosion if made into a pill with Argenti Nitras.

Dosage—Remember things that modify dosage. (Page 52.)

Acetum Opii, Tinctura Opii, Tinctura Opii Deodorati, Vinum Opii	aa 3–20 M.
Tinctura Opii Camphorata	1– 4 dr.
Pulvis Ipecacuanhae et Opii	3–15 gr.
Pulvis Opii and Opium Deodoratum	¼–2 gr.
Extractum Opii	⅛–1 gr.

MORPHINA,–AE, U. S. P.—Morphine.

Pharmaceutical Preparations—

Morphinae Acetas,–tatis, U. S. P.—Morphine Acetate.

Morphinae Hydrochloras,–atis, U. S. P. — Morphine Hydrochlorate.

Morphinae Sulphas,–atis, U. S. P.—Morphine Sulphate.

Incompatibles—Try them with Morphinae Sulphas solution.

1. Mineral salts (Plumbi Acetas solution).
2. All Tannins.
3. Liquor Potassii Arsenitis.
4. Alkalies and their carbonates. (Sodii Bicarbonas solution.)
5. Add a gt. Acidum Nitricum to a small crystal of Morphinae Sulphas in a small dish and it turns red, then orange and yellow.
6. Tinctura Ferri Chloridi causes a blue color in solutions of Morphinae Sulphas and green if used in excess. Gives the same result as No. 1 under Opium if Meconic Acid is present.

Test gtt. per drachm of Acetum Opii (90), Tinctura Opii (130), Tinctura Opii Camphorata (130) and Vinum Opii (100).

CODEINA,-AE, U. S. P.—Codeine—Methyl Morphine.

Read up in N. D.

Usually administered in pills, capsules or syrups.

PRESCRIPTIONS—

1. Write a compound one.
2. Compound the following prescription:

A. BLACK. February 3, 1897.

℞ Pulveris Ipecacuanhae et Opii..... 4.00
Quininae Sulphatis..... 2.00
Sodii Salicylatis..... 1.50
Glyceriti Amyli q. s.
Misce.—Fiant pilulae No. XII.
Signa.—Take one pill every 3–4 hours.
.....M. D.

NOTE.—Triturate the powders well together, put on the pill tile and add the Glyceriti Amyli as needed to make a pill mass that will roll without crumbling and yet not be too soft to retain its cylindrical shape. Use Lycopodium or Glycyrrhiza to keep from sticking to the pill tile or each other.

Quiz Will Follow this Exercise.

EXERCISE No. 17.

BROMUM,-I, U. S. P.—Bromine—Br.

PHARMACEUTICAL PREPARATIONS—

Examine them.

Acidum,-i Hydrobromicum,-i Dilutum,-i, U. S. P.—Dilute Hydrobromic Acid—HBr.

Ammonii Bromidum,-i, U. S. P.—Ammonium Bromide—NH_4Br.

Calcii Bromidum,-i, U. S. P.—Calcium Bromide—$CaBr_2$.

Lithii Bromidum,-i, U. S. P.—Lithium Bromide—LiBr.

Potassii Bromidum,-i, U. S. P.—Potassium Bromide—KBr.

Sodii Bromidum,-i, U. S. P.—Sodium Bromide—NaBr.

Strontii Bromidum,-i, U. S. P.—Strontium Bromide—$SrBr_2$.

Zinci Bromidum,-i, U. S. P.—Zinc Bromide—$ZnBr_2$.

PROPERTIES AND USES—

Read articles in N. D. and W. & W.

Bromum is rarely used in medicine but the bromides are used extensively, and their protracted use requires increasing doses.

Compare action of the different bromides.

Bromism: its causes, symptoms and treatment.

Calcii, Lithii, Strontii and Zinci Bromidi are very deliquescent, hence they should not be prescribed in powders. The rest are permanent in air.

Acidum Hydrobromicum Dilutum is miscible in all proportions with Aqua and Alcohol. Rarely causes Bromism. Prevents Cinchonism (as do the bromides) and makes an excellent solvent for the Cinchona alkaloids.

INCOMPATIBLES—

Use solution of Potassii Bromidum.

Chemical:

1. Acid Salts.
2. Acidum Nitricum Dilutum.
3. Plumbi Acetas solution.
4. Ammonii Bromidum solution and Spiritus Aetheris Nitrosi. What occurs?

Physiological:

All vaso-motor stimulants as Belladonna, Digitalis, Ergota, etc. Morphina is the best especially for the motor symptoms.

CONIUM,-I, U. S. P.—Conium—Hemlock—Conium Maculatum.
GELSEMIUM,-I, U. S. P.—Gelsemium—Yellow Jessamine or Jasmine.

PHARMACEUTICAL PREPARATIONS—

Extractum,-i Conii, U. S. P.—Extract of Conium.

Extractum,-i Conii Fluidum,-i, U. S. P.—Fluid Extract of Conium.

Extractum,-i Gelsemii Fluidum,-i, U. S. P.—Fluid Extract of Gelsemium.

Tinctura,-ae Gelsemii, U. S. P.—Tincture of Gelsemium.

INCOMPATIBLES—

Conium:

Depend upon the constituents. Antagonized by Nux Vomica preparations.

Gelsemium:

Antagonized by Alcohol, Ammonia, Digitalis and Morphina preparations. Chemically depends upon its alkaloidal and oily constituents.

PREPARATIONS AND THEIR PRESCRIBING.

Infusa:—Do not keep well. Dose too large. Strength should be ordered by a physician.

Linimenta:—Never saturate cloths with Ammonia or Chloroform liniments and bind on the skin, as they will blister. Always label "POISON" or "EXTERNAL USE ONLY." Soap liniment is much used as a vehicle for extemporaneous preparations.

Liquores:—Solution; saturated solution; supersaturated solution. Must know the approximate solubility of the materials in the solvent. Alcohol is a good solvent for oils and resins but precipitates gums and albumen, and water is the opposite. Glycerine aids the solution of Acidum Carbolicum.

Remember incompatibilities in making compound solutions.

Lotiones:—Usually aqueous solutions of medicinal agents intended for external use. Eye lotions are called "Collyria."

Massae.

Mellita:—Used in pill masses and as agreeable vehicles.

Misturae: — Precipitate undissolved materials upon standing. Always order "Shake" label. Usually prescribed in syrups or mucilages to suspend the undissolved particles.

℞ Pulveris Cretae Compositae..... 2.00
Aquae Cinnamomi..... 4.00
Aquae Destillatae..... 20.00

Misce.—Fiat mistura. (Rub the chalk with the cinnamon water and 2cc. of water in a mortar; then add rest of water gradually while triturating.)

Signa.—Chalk mixture. (Use in next prescription.)

Mucilageones:—Soothing to inflamed mucous surfaces. Used in liquid preparations to suspend insolubles and in solids as excipients.

℞ Misturae Cretae..... 20.00
Bismuthi Subnitratis..... 8.00
Aquae Cinnamomi..... 50.00
Mucilagiones Acaciae q. s. ad..... 128.00

M.—Fiat mistura.

Sig.—Take teaspoonful every two hours.

Quiz Will Follow this Exercise.

EXERCISE No. 18.

ACONITUM,-I, U. S. P.—Aconite (root)—Monkshood—Wolfsbane.
PILOCARPUS,-I, U. S. P.—Pilocarpus—Jaborandi—(Leaves).
VERATRUM,-I VIRIDE,-IS, U. S. P.—Veratrum Viride—American Hellebore.

PHARMACEUTICAL PREPARATIONS—

Extractum,-i Aconiti, U. S. P.—Extract of Aconite.

Extractum,-i Aconiti Fluidum,-i, U. S. P.—Fluid Extract of Aconite.

Tinctura,-ae Aconiti, U. S. P.—Tincture of Aconite.

Extractum,-i Pilocarpi Fluidum,-i, U. S. P.—Fluid Extract of Pilocarpus.

Pilocarpinae Hydrochloras,-atis, U. S. P.—Pilocarpine Hydrochlorate.

Extractum,-i Veratri Viridis Fluidum,-i, U. S. P.—Fluid Extract of Veratrum Viridis.

Tinctura,-ae Veratri Viridis, U. S. P.—Tincture of Veratrum Viridis.

READ N. D. articles and examine the preparations.

TEST the drops per drachm of each of the tinctures (145).

STRENGTH of the different tinctures of Aconitum: German, 10%; English, 16%; French, 20%; U. S. P., 35% and Fleming's, 79%. Be careful in prescribing them.

INCOMPATIBLES—

Antagonized by all vaso-motor stimulants, Atropina especially. Chemically with caustic alkalies, Ferric salts and metallic salts generally.

PREPARATIONS AND THEIR PRESCRIBING.

Oleata:—Supposed to be more readily absorbed than ointments of other bases.

Oleoresinae:—Strongest liquid preparations of vegetable substances, and they are best prescribed in emulsions, pills or capsules.

Pilulae:—Extemporaneous pills may be coated with gelatin, tolu, or silver foil, the sugar coating being used in manufacture of large quantities.

Convenient for drugs in small quantities and of a disagreeable taste.

Not good for insoluble or deliquescent preparations, those having a large dose, nor liquids. May dilute caustics with some inert substance.

Not so good as liquids for rapid action as they require solution before absorption. Efflorescent crystals should lose water of crystallization.

Must know character of materials in the pills to select the proper excipient, as the mass must not crumble and must be hard enough to retain its shape, and yet not pass through the intestinal canal undissolved. Choice of most of the excipients may be left to the pharmacist. Best liquid excipients are alcohol, water, syrup, glucose, glycerine, glycerite of starch, glycerite of tragacanth, honey and aromatic sulphuric acid. Best solid excipients are vegetable extracts, powdered acacia, powdered althea, bread crumbs, soap, hard petroleum, resin cerate and cacao butter.

When prescribing official pills write the name of the pill in the accusative case, followed by the number of pills wanted; extemporaneous pills write names of the materials in the genitive case followed by the total amount.

℞ Sodii Salicylatis..... 1.50
Ammonii Chloridi..... 1.00
Acetanilidi..... 0.50

Misce.—Fiant pilulae No. vj.

Signa.—Take one every three hours.

NOTE.—May use glycerine, syrup, mucilage, etc., for excipient, being careful not to use too much.

Pulveres:—Suitable for insoluble medicines, those of small dose and pleasant taste. Hygroscopic, deliquescent, efflorescent and volatile medicines, if desired in a powder, should be dispensed in paraffine paper. Caustics only when well diluted as with sugar of milk, cane sugar, compound chalk powder, aromatic powder, powdered licorice, starch, acacia and magnesia.

May be dispensed in a bulk or "Chartulae," which means in prescription "little package of powders."

℞ Pepsini Saccharati..... 2.00
Hydrargyri Chloridi Mitis..... 0.06
Pulveris Glycyrrhizae..... 4.00

Misce.—Fiant chartulae No. X.
Signa.—Take one after each meal.

Resinae:—Soluble in alcohol, insoluble in water and precipitated from alcoholic solutions by water. May be prescribed in pills, capsules, alcoholic solutions and some in powders.

Write a Prescription.

Quiz Will Follow this Exercise.

EXERCISE No. 19.

ARNICAE FLORES,-UM, U. S. P.—Arnica Flowers.
ARNICAE RADIX -ICIS, U. S. P.—Arnica Root.
GRINDELIA,-AE, U. S. P.—Grindelia (robusta).
PHYTOLACCAE FRUCTUS, U. S. P.—Phytolacca Fruit—Poke Berry.
PHYTOLACCAE RADIX, -ICIS, U. S. P.—Phytolacca Root—Poke Root.

Pharmaceutical Preparations—

Tinctura,-ae Arnicae Florum, U. S. P.—Tincture of Arnica-flowers.

Extractum, -i Arnicae Radicis, U. S. P.—Extract of Arnica-root.

Extractum,-i Arnicae Radicis Fluidum, -i, U. S. P.—Fluid Extract of Arnica-root.

Tinctura,-ae Arnicae Radicis, U. S. P.—Tincture of Arnica-root.

Extractum,-i Grindeliae Fluidum.-i, U. S. P.—Fluid Extract of Grindelia.

Extractum, i Phytolaccae Radicis Fluidum,-i. U. S. P.—Fluid Extract of Phytolacca-root.

Examine desk and other samples. Read N. D. articles.

Uses.—Spiritus Chloroformi disguises the bitter taste of Grindelia preparations. Aqueous mixtures precipitate the resins, hence better prescribed in mucilage or milk to suspend the resins.

NITRITES.

Amyl Nitris,-itis, U. S. P.—Amyl Nitrite—$C_5H_{11}NO_2$.

Sodii Nitris,-itis. U. S. P.—Sodium Nitrite—$NaNO_2$.

Spiritus Aetheris Nitrosi, U. S. P.—Spirit of Nitrous Ether—Sweet Spirit of Nitre.

Spiritus Glonoini, U. S. P.—Spirit of Glonoin—Spirit of Nitroglycerin.

Read N. D. articles on the above nitrites.

Incompatibles—

Spiritus Aetheris Nitrosi with Acidum Gallicum, Acidum Tannicum, Emulsae, Ferric salts, Potassii Iodidum and Tinctura Guaiaci. Why?

Test the number of drops per drachm of the Spiritus Aetheris Nitrosi.

PREPARATIONS AND THEIR PRESCRIBING.

Spiriti:—Those of volatile oils in alcohol are mostly used as flavoring agents or carminatives, and make cloudy or milky mixtures, owing to separation of oils when added in large quantities to water. Good solvents for resins, oleoresins and resinous extracts, and do not precipitate when added to fluid extracts and tinctures.

Suppositories:—May be made by hand or in moulds. Cacao-butter is the most frequent base, being solid at ordinary temperatures. A suppository of glycerin, sodium carbonate and stearic acid has been made official. Rectal are cone shaped and weigh one gm. Urethral (bougies) are cylindrical or pencil shaped and weigh one gm. Vaginal (pessaries) are globular and weigh three gms. Wax makes them firmer but remaining undissolved irritates the mucous membrane. Always give careful directions to pharmacist as to the kind and to the patient for use.

Syrupi:—Make pleasant vehicles or flavoring agents and may be used in mixtures to hold small insoluble particles in suspension. Freely miscible with aqueous liquids, but if concentrated and added to strong alcoholic liquids the sugar gradually crystallizes out of solution. Syrups of hydriodic acid, citric acid, garlic and squill are acid in reaction and should not be mixed with carbonates. Some are of distinct medicinal value.

Tabellae:—(Tablet triturates), none official; used for medicines of small dose.

Tincturae:—Not as strong as fluid extracts; not all of uniform strength, but each has its own definite strength. Many precipitate or become cloudy upon adding aqueous liquids. Strong mineral acids should not be added to tinctures. Nearly all contain tannin and these should not be mixed with iron preparations. Tinctures of ferric chloride and sanguinaria are acid, and the ammoniated tinctures of guaiac and valerian are strongly alkaline.

Triturationes:—Usually dispensed in small powders.

Trochisci:—Should not be made of drugs of disagreeable taste nor of efflorescent, deliquescent nor caustic substances; usually desire to obtain local action of ingredients upon the mucous membrane of the mouth and pharynx. When prescribing official lozenges the name is to be written in the accusative case, followed by the number desired.

Unguenta:—Applied by inunction. The basis may be lard, benzoinated lard, simple ointment, lanolin (wool fat), cold cream, hard petroleum, glycerite of starch or boro-glycerin. Should be perfectly smooth, containing no hard or gritty particles. When desiring to use a substance insoluble in the base, treat it with some solvent before mixing the ointment.

Vini:—White wine the menstruum; all freely miscible with water; not so strongly alcoholic as tinctures.

1. Dissolve 5 grs. of Ammonii Carbonas in ⅓ of a t. t. of Aquae Cinnamomi, add an equal amount of Extractum Glycyrrhizae Fluidum, shake thoroughly and allow to stand for a half hour. Glycyrrhizin is precipitated because the ammonia, holding it in solution, is neutralized by the bicarbonate present in the Ammonii Carbonas. This is a frequent chemical and pharmaceutical incompatibility.

Quiz Will Follow this Exercise.

EXERCISE No. 20.

(See No. 3.)

CINCHONA,-AE, U. S. P.—Cinchona (Calasaya.)
CINCHONA,-AE RUBRA.-AE, U. S. P.—Red Cinchona.

PHARMACEUTICAL PREPARATIONS—

Extractum,-i Cinchonae Fluidum,-i, U. S. P.—Fluid Extract of Cinchona.

Infusum,-i Cinchonae, U. S. P.—Infusion of Cinchona.

Tinctura,-ae Cinchonae, U. S. P.—Tincture of Cinchona.

Tinctura,-ae Cinchonae Composita, ae, U. S. P.—Compound Tincture of Cinchona.

ALKALOIDAL PREPARATIONS—

Quinidiniae Sulphas, -atis, U. S. P.—Quinidine Sulphate.

Quinina,-ae, U. S. P.—Quinine.

Quininae Bisulphas, -atis, U. S. P.—Quinine Bisulphate.

Quininae Hydrobromas,-atis, U. S. P.—Quinine Hydrobromate.

Quininae Hydrochloras,-atis, U. S. P.—Quinine Hydrochlorate.

Quininae Sulphas,-atis, U. S. P.—Quinine Sulphate.

Quininae Valerianas,-atis, U. S. P.—Quinine Valerianate.

Ferri et Quininae Citras,-atis, U. S. P.—Iron and Quinine Citrate.

Vinum,-i Ferri Amarum,-i, U. S. P.—Bitter Wine of Iron.

Cinchonidinae Sulphas,-atis, U. S. P.—Cinchonidine Sulphate.

Cinchonidinae Salicylas,-atis, U. S. P.—Cinchonidine Salicylate.

Cinchonina,-ae—Cinchonine.

Cinchoninae Sulphas,-atis, U. S. P.—Cinchonine Sulphate.

READ N. D. articles on Cinchona and its alkaloids and their preparations.

RELATIVE antipyretic effects of the alkaloids: Quinina, 100: Quinidina, 90; Cinchonina, 40, and Cinchonidina, 70.

PROPERTIES—

Examine Quininae Sulphas and Cinchonidinae Sulphas.

Solubility in Aqua is increased by most acids, Ammonii Chloridum, Potassii Nitras, etc., but decreased by Magnesii Sulphas, Sodii Sulphas and neutral tartrates.

Precipitated by all Ferric salts and general precipitants of the alkaloids.

Can be prescribed with Tinctura Ferri Chloridi because of its contained free acid. Read up Cinchonism and use of Bromides in its treatment.

Should be avoided by persons having middle ear diseases, gastro-intestinal disorders or those having an idiosyncrasy against them.

TEST for purity of Quininae Sulphas: (other alkaloids, lime, chalk, magnesia, starch, etc.) Mix 1 gm. Quininae Sulphas in a mortar with 0.50 gm. Ammonii Sulphas and 5cc. Aqua Destillata; place in an evaporating dish and dry thoroughly on a water bath, agitate the neutral residue with 10cc. Aqua Destillata, allow to macerate for ½ hour at 15° C. with occasional agitation, filter and mix in a t. t. 5cc. of the filtrate with 7cc. Aquae Ammoniae and a pure salt will give a clear solution.

INCOMPATIBLES—

Use solutions of Quininae Sulphas and Cinchonidinae Sulphas. Note reactions and determine reasons if possible in each case.

1. Add Aqua Ammoniae to each. Then excess of precipitant.
2. Add Liquor Potassae to each.
3. Add Acidum Sulphuricum Dilutum to each. Which gives fluorescence? If both become fluorescent what is indicated?
4. Add Potassii Acetas solution to each. Same with tartrates.
5. Add Acidum Tannicum solution to each.

GENERAL INCOMPATIBLES—

Determine what occurs in each case and why.

1. Add Liquor Potassae to a solution of Chloral and heat.
2. Add a solution of Potassii Iodidum to a solution of Hydrargyri Chloridum Corrosivum.

3. Add solution of Zinci Sulphas to a solution of Plumbi Acetas.
4. Why are strong alcoholic tinctures not compatible with weak ones?
5. Add some Aqua to some Tinctura Guaiaci.
6. Add Mayer's Reagent to a little Tinctura Cinchonae Composita.
7. Add Spiritus Aromaticus Ammoniae to some Tinctura Opii.
8. Add solution of Sodii Salicylas to some Tinctura Ferri Chloridi.

PRESCRIPTIONS—

1. Write a compound one, containing a Cinchona alkaloid.
2. Compound the following:

℞ Quininae Sulphatis ..... gr. xvj
Extracti Nucis Vomicae ..... gr. j
Ferri Reducti ..... gr. vj
M.—Fiant capsulae No. vj.
Sig.—Take one after each meal.
..... M. D.

Quiz Will Follow this Exercise.

EXERCISE No. 21.

ANTIPYRETICS.

Acetanilidum, -i, U. S. P.—Acetanelid—Antifebrin—Phenylacetamide—Acetylamidobenzene.

Antipyrinum, -i—Antipyrine—Dimethyl-phenylpyrazolon.

Phenacetinum, -i—Phenacetin — Para-acetphenetidin—Para-oxyethylacetanelid.

Read N. D. articles and examine samples.

ACETANILIDUM.

TESTS—

1. A cold saturated aqueous solution added to Ferric Chloride test solution (T. S.) should not affect its color. (U. S. P.) This shows absence of aniline salts, antipyrine, hydracetin and some other compounds. This mixture becomes deep red on being heated. (N. D.)
2. Heat 0.1 gm. with 5cc. KOH (1:4); aniline odor becomes noticeable; add 1cc. Chloroform and heat; disagreeable odor of isonitril is evolved. All primary amines show the same reaction. (U. S. P.)
3. Boil 0.1 gm. for several minutes with 2cc. HCl, a clear solution results; add 3cc. of a 5% aqueous solution of Ac. Carbolicum and mix; then add 5cc. of a filtered saturated solution of chlorinated lime. A brownish-red color forms, which becomes blue upon supersaturation with NH_4OH. (U. S. P.) Indophenol or Indoaniline reaction. Shown by Phenacetinum, etc., but melting point, solubility, etc., distinguishes the Acetanilidum.

INCOMPATIBLE with Chloroformum, Potassa and Soda and their salts.

Antidotes—

Evacuate bowels with oils; stimulate skin by heat and friction; administer coffee and inject Aether. Alcohol is not advisable.

Uses—

Does not liquefy when triturated with stearoptans or phenols. Best administered dry or dissolved in alcohol and then diluted with water.

Soluble in cold water at 1: 194 and in alcohol 1: 5.

Derivatives—

Bromoacetanelid; Benzanilid; Methylacetanelid or Exalgin.

ANTIPYRINUM. P. G. (Phenazonum B. P.)

Tests and Incompatibles—

Use an aqueous solution.

1. Precipitates white with most reagents for alkaloids, and metallic salts.
   (*a*) Try with Plumbi Acetas solution.
   (*b*) Try with Hydrargyri Chloridum Corrosivum solution.
   (*c*) Try with Potassii Iodidum solution or Tinctura Iodi.
2. Forms salts with all acids because of its strong basic properties.
   (*a*) 2cc. of a 1% solution acquire with 2 gtt. of fuming HNO_3 a green color; boil and add 1 gtt. of the acid and note the red change. Cold concentrated solutions will form green crystals.
   (*b*) Spiritus Aetheris Nitrosi and acid solutions of all nitrites. What occurs?
3. Iron and iron salts; hence protect carefully from iron.
   (*a*) Add 1 gtt. Ferric Chloride T. S. to 2cc. of a 1% solution; deep red color is produced, changing to pale yellow on adding 10 gtt. H_2SO_4.
4. Reduces Fehling's solution. Try as in glucose test.
5. Incompatible with
   (*a*) Cinchona salts and preparations.
   (*b*) Caffeine salts and preparations.
   (*c*) All tinctures containing tannin.

6. Trituration dry. Try with Chloral, Sodii Bicarbonas or Sodii Salicylas.
   (*a*) Oleaginous liquid with Chloral, the stearoptans, Acidum Carbolicum, etc.
   (*b*) Liquefaction with Sodii Salicylas is due to deliquescence.
   (*c*) Forms toxic Naphthol with Hydrargyri Chloridum Mite.
7. Equal mixture with Acetanilidum melts at 43° C.; each alone at 113° C.

Uses—

May be triturated dry with Salol. Best prescribed alone, because of its incompatibility. Dissolved in wine it gradually precipitates the coloring matters. Syrups, fruit syrups with an aromatic spirit makes the best adjuvant. Soluble in ⅔ its weight of water and 1 part of Alcohol and Chloroformum.

Derivatives—

Benzopyrine, Iodopyrine, Naphtopyrine, Phenopyrine, Picropyrine, Pyrogallopyrine.

Salipyrine:—Molecular equivalents of Antipyrinum, and Acidum Salicylicum. Heated together with or without water they melt to an oily liquid which solidifies on cooling and is recrystallized from alcohol. Most used of the derivatives.

PHENACETINUM. Br. Ad. P. G.

Tests—

1. A cold saturated aqueous solution should not become turbid on the addition of bromine water. (Absence of Acetanilid.) N. D. Soluble in 1400 of cold water and 16 of alcohol.

Derivatives—

Iodophenine, 50% Iodine: Methacetin, methyl compound: dose smaller.

Write a compound prescription.

Quiz Will Follow this Exercise.

EXERCISE No. 22.

ACIDUM CARBOLICUM AND DERIVATIVES.

Acidum,-i Carbolicum,-i, U. S. P.—Carbolic Acid—Phenol—C_6H_5OH.

Acidum,-i Carbolicum,-i Crudum,-i, U. S. P.—Crude Carbolic Acid.

Glyceritum, i Acidi Carbolici, U. S. P.—Glycerite of Carbolic Acid.

Sodii Sulphocarbolas, atis, U. S. P.—Sodium Sulphocarbolate $NaSO_3C_6H_4(OH)+2H_2O$.

Unguentum, i Acidi Carbolici, U. S. P.—Ointment of Carbolic Acid.

Creosotum,-i, U. S. P.—Creosote.

Aqua, ae Creositi, U. S. P.—Creosote Water.

Naphtalinum,-i, U. S. P.—Naphtalin.

Naphtol, U. S. P.—Naphtol—Beta-Naphtol (also an Alpha-Naphtol.)

Read N. D. articles and examine samples presented.

ACIDUM CARBOLICUM.

Prepared from "dead oil" of coal tar by distillation between 170°–190°. Prepared synthetically by acting upon benzine with fuming sulphuric acid, neutralizing with Potassii Carbonas and fusing with excess of Potassa; treat the residue with HCl and distill.

PROPERTIES—

Examine them: Should dissolve clear in 15 parts of water: this solution if alkaline shows it to be an alkaline solution of the acid; should be faintly acid. Red color indicates metallic impurities.

Tests—

1. Put 1–2 cc. Acidum Sulphuricum in a t.t.; add, but do not mix, an equal amount Acidum Carbolicum solution; drop in *small* particles of Potassii Nitras and each will produce a violet streak; shake and all becomes violet; add water and it turns red orange. $\frac{1}{10}$% shown. (N. D.)
2. Add to Acidum Carbolicum solution in a t.t., one-fourth its volume of Aqua Ammoniae, then add a few gtt. of solution of Chlorinated Lime (1:20). Heat moderately, producing in fifteen minutes blue or green, changing to red on acidulating with Acidum Sulphuricum or Acidum Hydrochloricum; 1:4000. (N. D.)
3. Make concentrated alcoholic solution in a t.t., add a little Ferric Chloride T. S.; forms a brown liquid; addition of much water makes permanent violet-blue color.
4. Percentage amount of pure phenol is determined by titration with a decinormal Bromine solution and depends upon the precipitation of Tribromophenol.

Incompatibles—

Potassii Permanganas, Iodine, Bromine, caustic, alkaline, and iron salts; coagulates albumen; precipitates collodiens; liquefies on trituration with stearoptans, antipyrine, chloral, etc.

Uses—

Should be kept in dark amber-colored, well-stoppered bottles. Soluble sulphate is best antidote in poisoning cases, forming harmless sulpho-carbolates; use stimulants, emetics, etc.

CREASOTUM.

Mixture of phenols, chiefly guaiacol and cresol, obtained by distillation of wood-tar.

Properties—

Examine sample.

Tests—

N. D. No. 3 answers for coal-tar creasote.

1. Equal volume with collodion in a dry t.t. should form no coagulum.

2. Equal volume with glycerine forms a clear solution which precipitates oily creosote upon addition of one volume or more of water.
3. One gt. Ferric Chloride T. S. added to 10c.c. of 1% aqueous solution of Creasote causes a violet blue tint rapidly changing to green and brown, usually forming a brownish precipitate.
4. Fröhde's Reagent (Molybdic Acid 1 in Acidum Sulphuricum 100) is reliable for mixture with Acidum Carbolicum which gives a yellowish or brownish tint, passing into maroon or reddish brown and finally a brilliant purple, while pure Creasotum gives a brown or reddish brown which fades gradually into a light yellowish brown.

Add 1–2 gtt. aqueous solution to 3–5 gtt. of the reagent; warming aids reaction.

USES—

Soluble in 150 of water; freely in Alcohol, Ether, Chloroform. Acidum Carbolicum is chief impurity. Neutral or slightly acid. Decomposed by strong acids. Reduces Silver Nitrate and explodes with Silver Oxides. Preserves meat. Administered in emulsions with Oleum Morrhuae and Mucilago; Oleum Morrhuae and Hypophosphites; Syrupus Pruni Virginianae and Mucilago; Glycerinum and Spiritus Frumenti. Hypodermically not a good way; Enteric pills a good way. Begin with small dose and increase gradually. Creasote Carbonate contains 92% of Creasotum, is not caustic and is given in large doses.

NAPHTALINUM.

Very incompatible. A true intestinal antiseptic; best given on starch wafers with Oleum Bergamottae.

NAPHTHOL.

Same relation to Naphthalene as Acidum Carbolicum to Benzene. Heating Naphthalene with concentrated Acidum Sulphuricum forms Naphthalene Sulphonic Acid. The "Alpha" forms at

or below water bath temperature and the "Beta" forms at a higher temperature. "Alpha" is far more poisonous, hence the "Beta" is the one most used in medicine.

Derivatives—

Benzonaphtol, Betol or B-Naphtol Salicylate; Alumnol; Hydronaphtol, etc.

Write a prescription.

Quiz Will Follow this Exercise.

EXERCISE No. 23.

ACIDUM SALICYLICUM GROUP.

Acidum,-i Salicylicum,-i, U. S. P.—Salicylic Acid—$HC_7H_5O_3$.

Salicinum,-i, U. S. P.—Salicin.

Salol, U. S. P.—Salol—Phenyl Salicylate—$C_6H_4(OH)CO_2C_6H_5$.

Sodii Salicylas,-atis, U. S. P.—Sodium Salicylate.

Salophen.

Oleum,-i Gaultheriae, U. S. P.—Oil of Gaultheria—Oil of Wintergreen.

Spiritus Gaultheriae, U. S. P.—Spirit of Gaultheria.

Methyl,-is Salicylas,-atis, U. S. P.—Methyl Salicylate—Artificial Oil of Wintergreen—$CH_3.C_7H_5O_3$.

Examine Acidum Salicylicum, Sodii Salicylas, Salol and Salicinum.

SALICINUM.

A true glucoside. Differs how from Ameroids and Alkaloids?

TESTS—

1. Bright red color when dissolved in conc. H_2SO_4; this precipitates dark-red powder, leaving colorless solution on adding H_2O.
2. Add to a little Salicinum in a dry t. t. some H_2SO_4 dil. and dry $K_2Cr_2O_7$, and then upon warming notice odor of oil of meadow sweet (Salicyl Aldehyde.)
3. Does not precipitate with alkaloidal precipitants. Try Mayer's Reagent.

ACIDUM SALICYLICUM.

PREPARATION—

1. Treating Oleum Gaultheriae with caustic alkali and decomposing resulting salt with an acid.

2. Synthetic process (usual way). Saturate Acidum Carbolicum with NaOH, forming Sodii Carbolas; dry and treat with CO_2, forming Sodii Phenol Carbonas; heat in tightly closed vessels or in stream of CO_2, forming Sodii Salicylas; treat with an acid. Improvement on Kolbe's original method.

PROPERTIES—

Should have no phenol odor. Synthetic acid and its salts may contain Creosotic acids and salts, which are very depressing. Solubility in water (450) is greatly increased by the presence of alkaline phosphates, acetates, citrates and borax, the latter becoming bitter.

TESTS—

1. Add 1cc. concentrated H_2SO_4 to some Acidum Salicylicum in a dry t. t. and then cautiously about 1cc. Methyl Alcohol, in drops; boil and notice odor of Oleum Gaultheriae.
2. Solutions acquire a deep violet color with Ferric Chloride, if alkalies, their salts and most acids are absent.

USES—

Medicinal uses of the acid and the salts are the same. Acid is antiseptic. Aqueous solution of the salts precipitate the acid if an acid is added. Acid 1, Borax ½, Glycerine 2½, makes a 25% solution. Soluble with alkalies; turn brown upon exposure to the air unless excess of acid is present. Causes salicylism in 60% of persons; relieved by Bromides or Alcohol 15 minutes before each dose. Administer acid well diluted to prevent gastric irritation. Eliminated in the urine and may simulate sugar reduction tests.

OLEUM GAULTHERIAE.—Methyl Salicilate.

Same action but smaller dose and less irritation than the acid.

SALOL.—Phenyl-Salicylate.

Properties of both acids. Should not redden moistened red litmus paper.

Almost insoluble in water. Use cautiously in kidney troubles.

INCOMPATIBLES—

Acids and all derivatives are incompatible with oxidizing agents, iron salts, lime water, KI and soap. Salts with Acids. Salol with camphor.

1. Nitrous Acid of Spiritus Aetheris Nitrosi decomposes acids and salts, mixtures gradually darken and form black sediment and odor of Oleum Gaultheriae.
2. Add Sodii Salicylas solution to Tinctura Ferri Chloridi.
3. Add Sodii Bicarbonas solution to Tinctura Ferri Chloridi.
4. Why not add Aqua Camphorae to Tinctura Guaiaci?
5. Why not combine Sodii Salicylas and Antipyrinum in powders?
6. Why not combine Sodii Salicylas, HCl and H_2O.

PRESCRIPTIONS—

1. Write a compound prescription.
2. Compound the following:

℞ Sod. Salicyl. 2.00
Acetanelid. 1.00
Ammo. Chlorid. 1.00
M.—Ft. chart. No. VI.
Sig.—Take one every two hours.

NOTE.—Why should the following prescription not be prescribed in this manner, or what precautions should the pharmacist take?

Quiz Will Follow this Exercise.

EXERCISE No. 24.

ACIDUM BENZOICUM GROUP.

Benzoinum,–i, U. S. P.—Benzoin.

Adeps,–ipis Benzoinatus,–i, U. S. P.—Benzoinated Lard.

Tinctura,–ae Benzoini, U. S. P.—Tincture of Benzoin.

Tinctura, –ae Benzoini Composita,–ae, U. S. P.—Compound Tincture of Benzoin—Friar's Balsam.

Acidum,–i Benzoicum,–i, U. S. P.—Benzoic Acid.

Ammonii Benzoas,–atis, U. S. P.—Ammonium Benzoate.

Sodii Benzoas,–atis, U. S. P.—Sodium Benzoate.

Read W. & W. or N. D. Examine Acidum Benzoicum, Ammonii Benzoas, Tinctura Benzoini Composita.

BENZOIN—

A balsamic resin; occurs in gummy tears; soluble in alcohol; contains resins, a volatile oil and Acidum Benzoicum 12-20 %.

ACIDUM BENZOICUM—

Prepared from Benzoin by sublimation and a wet process and also synthetically from toluene.

TESTS—

1. Completely vaporizes on heating.
2. Gently warm 0.5 gm. Acidum Benzoicum, 0.5 gm. $K_2Mn_2O_8$ and 5cc. of H_2O in a loosely stoppered t.t. in a water bath (45° C); stopper tightly and cool under cold water faucet; develops odor of bitter almond oil if cinnamic acid is present.
3. Pure acid does not decolorize $K_2Mn_2O_8$ solution. Bring to a boil in a t.t. 0.1 gm. Acidum Benzoicum, 5–10 gtt. $K_2Mn_2O_8$ solution (1–200), and 5cc. H_2O.

Uses—

Aqueous solution is aided by presence of Sodium Phosphate or Borate. Pills with Balsam of Fir or Castile Soap.

AMMONII BENZOAS. SODII BENZOAS.

1. Dissolve Acidum Benzoicum 4 gm., in a mixture of Aqua Ammoniae 6cc. and Aqua 8cc. Evaporate one-half on water bath, keeping alkaline with NH_4OH, (why?); set aside to crystallize; dry between filter papers. Test its properties:
   (*a*) Soluble in water.
   (*b*) Neutral solution.
   (*c*) Precipitates flesh colored with ferric salts.
   (*d*) Evolves NH_3 when heated with KOH.
2. Add to 2 gm. Acidum Benzoicum suspended in 4cc. H_2O, 1.5 gm. $HNaCO_3$; after CO_2 evolution ceases, neutralize carefully, filter and evaporate with frequent stirring, remove heat when one-half is evaporated and stir until cold.

Uses—

Chief action externally is antiseptic; internally stimulates bronchial membranes and renders alkaline urine acid. Ammonii Benzoas is the preferable form of administration; Spiritus Chloroformi disguises its taste. Often advantageously combined with urinary sedatives as Tinctura Hyoscyami. Soluble in 5% of water and the acid in 500 parts. Incompatible with Ferric salts, Liquor Potassae and acids.

ANTISEPTIC OILS, MINTS, ETC.

Oleum,-i Cajuputi, U. S. P.—Oil of Cajuput.
Oleum,-i Caryophylli, U. S. P.—Oil of Cloves.
Oleum,-i Eucalypti, U. S. P.—Oil of Eucalyptus.
Oleum,-i Gaultheriae, U. S. P.—Oil of Wintergreen.
Oleum,-i Thymi, U. S. P.—Oil of Thyme.
Mentha,-ae Piperita,-ae, U. S. P.—Peppermint.
Oleum,-i Menthae Piperitae, U. S. P.—Oil of Peppermint.
Spiritus Menthae Piperitae, U. S. P.—Spirit of Peppermint.
Mentha, ae Viridis, U. S. P.—Spearmint—Greenmint.

Oleum,-i Menthae Viridis, U. S. P.—Oil of Spearmint.
Spiritus Menthae Viridis, U. S. P.—Spirit of Spearmint.
Menthol, U. S. P.—Menthol.
Thymol, U. S. P.—Thymol.

THYMOL. MENTHOL.

Examine them. Both freely soluble in alcohol but not in water. Both liquefy when treated with Camphor, Chloral, Acidum Carbolicum or each other. Both volatilize without residue on heating.

1. Triturate Menthol and Camphor together in a small dish. Note result and then add Acidum Sulphuricum and note the blue color produced. Reddish brown result.
2. Dissolve a small crystal of Thymol in glacial acetic acid, add 6 gtt. Acidum Sulphuricum and 1 gt. Acidum Nitricum and note the blue-green. Gives no color with Menthol.

MENTHA PIPERITA. MENTHA VIRIDIS.

An Oleum, Aqua and Spiritus of each is official.

Why are they incompatible with aqueous solutions and menstruums?

Chiefly used as a carminative or stimulant in colics and to relieve or reduce griping of purgatives. Mints repel insects. Thymol may attract them. 1–5cc. Oleum Menthae Piperitae, 1cc. Acidum Aceticum Glaciale and 1 gt. Acidum Nitricum gives a green, greenish blue or violet color.

Keep the oils in well stoppered vials, protected from the light and in a cool place.

ANTISEPTIC OILS.

Oleum Carophylli—Cloves.

Incompatible with Liquor Calcis, Iron salts, mineral acids and gelatine. Used to prevent griping of purgatives.

Oleum Gaultheriae (Wintergreen), *Cajuputi, Eucalypti and Thymi.*

All are volatile oils and are best administered in emulsions, alcoholic, etherial or chloroform solutions. Very good in liniments.

PRESCRIPTIONS—

1. Write a compound one.
2. Why not use the following prescription?

JOHN JONES. Feb. 11th, 1897.

℞ Acidi Benzoici..... 8.00
Sodii Boratis..... .....12.00
Tincturae Ferri Chloridi 4.00
Aquae Destillatae q. s. ad.....128.00
M.—Fiat misturae.
S.—Shake well and take a teaspoonful every hour.
.....M. D.

Quiz Will Follow this Exercise.

EXERCISE No. 25.

EMETICS.

Read N. D. and W. & W. articles upon the emetics considered.

Classes—

Mineral and vegetable, according to their origin.

Local and general, according to their action. How determine the class?

Local—

Alumen, Ammonii Carbonas, Aqua, Cupri Sulphas, Sodii Chloridum, Zinci Sulphas and Sinapis.

General—

Antimonii et Potassii Tartras, Apomorphia, Ipecacuanha, Scilla and Senega.

LOCAL EMETICS.

Alumen, -inis, U. S. P.—Alum—Potassium Alum—Ammonium and Potassium Sulphate.

Alumen, -inis Exsiccatum, -i, U. S. P.—Dried Alum—Burnt Alum.

What is the general formula? How is it prepared and what kinds of alums are there?

1. Alkalies and their carbonates precipitate Alumina Hydras, which is insoluble in Aqua Ammoniae or the carbonates, but soluble in Liquor Potassae or Sodae.

2. Place 1 gm. Alumen on a small evaporating dish and heat on the triangle until dried; cool and pulverize; loses 45% of its weight. Why place in glass stoppered bottles? Why incompatible with alkalies, mineral salts, tannins and tartrates?

Cupri Sulphas,-atis, U. S. P.—Copper Sulphate—Blue Vitriol—$CuSO_4 \cdot 5H_2O$.

Zinci Sulphas,-atis, U. S. P.—Zinc Sulphate—$ZnSO_4 \cdot 7H_2O$.

Incompatible with alkalies, Argentum, Calcium and Plumbum salts; iodides and tannins. Why in each case? Try some of them and note results.

Examine Exercise No. 8 for Alumen, Cupri Sulphas and Zinci Sulphas.

Sinapis Alba,-ae, U. S. P.—White Mustard.

Sinapis Nigra,-ae, U. S. P.—Black Mustard.

Ground Mustard is often adulterated with starchy powders.

Make a decoction of mustard in a t. t., cool and add Lugol's solution; a blue or greenish color indicates adulteration. Why cool before adding Lugol's solution?

GENERAL EMETICS.

Antimonii et Potassii Tartras,-atis, U. S. P.—Antimony and Potassium Tartrate—Tartar Emetic—Tartrated Antimony.

Properties—Examine them.

1. Physical.
2. Alcohol precipitates from aqueous solutions.
3. Test for Chlorides with Argenti Nitras solution. What would be the reaction?
4. Add Acidum Hydrochloricum Dilutum to a solution. What results? Add an excess and what occurs?
5. "Cream of Tartar" is the most likely impurity. Dissolve 24 grs. in a fluid ounce Aqua Destillata, cool and a crystalline precipitate will occur if more than 8% of this impurity is present.

Ipecacuanha,-ae, U. S. P.—Ipecac (root).

Extractum,-i Ipecacuanhae Fluidum, i, U. S. P.—Fluid Extract of Ipecac.

Syrupus,-i Ipecacuanhae, U. S. P.—Syrup of Ipecac.

Examine desk sample of the root, and sample of the fluid extract.

The root contains an acid, alkaloids, a glucoside, tannin, oil, gum, etc.

The fluid extract is a strong alcoholic preparation, contains Glycerinum to prevent its souring and is the chief preparation used.

INCOMPATIBLES—

Why in each case?

1. Alumen, Cupri Sulphas or Magnesii Sulphas solution with Extractum Ipecacuanhae Fluidum. What would be the incompatible constituent of the Ipecac?
2. Ammonii Iodidum solution and Spiritus Aetheris Nitrosi.
3. Potassii Iodidum and Quininae Bisulphas in aqueous solutions.
4. Tinctura Cimicifugae and Syrupus.
5. Tinctura Guaiaci and Tinctura Lavendulae Composita.
6. Plumbi Acetas and Zinci Sulphas solutions.

PRESCRIPTIONS—

1. Write a compound prescription for emetic purposes.
2. Would the following prescriptions be compatible, and if not, why not?

℞ Sodii Salicylatis..... 2.66
Quininae Sulphatis..... 0.66
Acidi Sulphurici Aromatici..... 0.66
Aquae Destillatae q. s. ad..... 5.00
M.—Sig.—..... ....
.....M. D.

℞ Ammonii Benzoatis..... 0.60
Acidi Nitrici Diluti..... 1.50
Aquae Menthae Piperitae q. s. ad..... 6.00
M.—S.
.....M. D.

Quiz Will Follow this Exercise.

EXERCISE No. 26.

CATHARTICS.

CLASSES—

Look up in N. D., W. & W., or P. Q. C.

LAXATIVES.

Magnesii Carbonas,-atis, U. S. P.—Magnesium Carbonate—Magnesia Alba.

Oleum,-i Ricini, U. S. P.—Castor Oil.

Sulphur,-is Lotum,-i, U. S. P.—Washed Sulphur.

Fruits.

SIMPLE PURGATIVES.

Aloe,-s Barbadensis, U. S. P.—Barbadoes Aloes.

Aloe,-s Socatrina,-ae, U. S. P.—Socatrine Aloes.

Aloe,-s Purificata,-ae, U. S. P.—Purified Aloes.

Aloinum,-i, U. S. P.—Aloin.

Extractum,-i Aloes, U. S. P.—Extract of Aloes.

All preparations containing Aloes as the chief ingredient.

Rhamnus,-i Purshiana,-ae, U. S. P.—Cascara Sagrada.

Extractum,-i Rhamni Purshianae Fluidum,-i, U. S. P.—Fluid Extract of Cascara Sagrada.

Rheum,-i, U. S. P.—Rhubarb.

Extractum,-i Rhei, U. S. P.—Extract of Rhubarb.

Syrupus,-i Rhei Aromaticus,-i, U. S. P.—Aromatic Syrup of Rhubarb.

Tinctura,-ae Rhei, U. S. P.—Tincture of Rhubarb.

Senna,-ae, U. S. P.—Senna—Senna-Leaves.

Extractum,-i Sennae Fluidum,-i, U. S. P.—Fluid Extract of Senna.

Pulvis,-eris Glycyrrhizae Compositus,-i, U. S. P.—Compound Licorice Powder.

SALINE PURGATIVES.

Magnesii Sulphas,-atis, U. S. P.—Magnesium Sulphate—Epsom Salt—$MgSO_4.7H_2O$.

Magnesii Citras,-atis Effervescens,-tis, U. S. P.—Effervescent Magnesium Citrate.

Potassii Bitartras,-atis, U. S. P.—Potassium Bitartrate—Cream of Tartar—$HKC_4H_4O_6$.

Potassii et Sodii Tartras,-atis, U. S. P.—Potassium Sulphate.

Sodii Sulphas,-atis, U. S. P.—Sodium Sulphate—Glauber's salt.

DRASTIC PURGATIVES.

Cambogia,-ae U. S. P.—Gamboge.

Jalapa,-ae, U. S. P.—Jalap.

Extractum,-i Jalapae, U. S. P.—Extract of Jalap.

Pulvis, eris Jalapae Compositus, i, U. S. P.—Compound Jalap Powder.

Oleum,-i Tiglii, U. S. P.—Croton Oil.

Scammonium,-i, U. S. P.—Scammony.

CHOLOGOGUE PURGATIVES.

Hydrargyrum Preparations.

Leptandra,-ae, U. S. P.—Leptandra—Culver's Root—Black-root.

Podophyllum,-i, U. S. P.—Podophyllum — May-apple — Mandrake-root.

Resina,-ae Podophylli, U. S. P.—Resin of Podophyllum.

EXAMINE Sulphur Lotum, Magnesii Carbonas, Magnesii Sulphas, Sodii Phosphas, Potassii et Sodii Tartras, Potassii Tartras, Oleum Ricini, Rheum and Extractum Rhamni Purshiana. Desk samples of Castor Bean, Aloe, Rhamnus Purshiana, Cambogia, Jalapa, Podophyllum and Scammonium.

Magnesii Carbonas:—What is the composition of the official salt? What varieties and how prepared? Agreeably given in carbonated waters. Dissolve a little in Acidum Nitricum Dilutum. What occurs? Add Argenti Nitras solution and Barii Chloridum solution to separate portions of the preceding solution, and if they precipitate, what is indicated?

Magnesii Sulphas:—Test as with Magnesii Carbonas and Acidum Nitricum Dilutum. Most active when taken well diluted and on an empty stomach. Advisable in febrile affections because of its refrigerant effects.

Pulvis,-eris Effervescens,-tis Compositus, i, U. S. P.—Compound Effervescent Powder—Seidlitz Powder. What is its composition and method of administration?

Sodii Phosphas:—How is it prepared? What is its composition?

Oleum Ricini:—How is the oil prepared? It is best administered in milk, coffee, lemon juice, whiskey, aromatic waters, etc.

Hydrargyrum Preparations:—Refer to Exercise No. 8.

USES—

Aloe:—Habitual constipation, governing griping by Hyoscyamus, etc. Good stomachic. Not used in pregnancy, menorrhagia or piles.

Rhamnus Purshiana:—Aromatic fluid extract is the best form to use. Aqua Chloroformi is the best menstruum. Has strong bitter principles, resins, etc.

Rheum:—Where the bowel trouble is due to indigestion. Never alone because of its griping; Sodii Bicarbonas is a useful adjuvant.

Podophyllum:—Used as a chologogue only, hence in biliousness. Slow acting; begin with a small dose; govern griping with Hyoscyamus, etc.

Senna:—Best in simple constipation. Nauseating and griping. Infusion said to contain more of the active principles, but it decomposes very rapidly. What is "Black Draught?"

INCOMPATIBLES—

1. Is Liquor Calcis or Liquor Potassae compatible with Magnesii Carbonas, Magnesii Sulphas or Sodii Phosphas?
2. Would a liquid prescription containing Magnesii Sulphas and Sodii Phosphas be compatible?

PRESCRIPTIONS—

Write a compound one.

Quiz Will Follow this Exercise.

EXERCISE No. 27.

DIURETICS.

READ W. & W. article (page 60) on this class of remedies.

READ up each preparation in your text books.

Acidum, i Benzoicum,–i, U. S. P.—Benzoic Acid. Refer to No. 24.

Buchu, U. S. P.—Buchu (leaves of long and short).

Extractum,–i Buchu Fluidum,–i, U. S. P.—Fluid Extract of Buchu.

An infusion is also used of this drug.

Copaiba,–ae, U. S. P.—Copaiba—Balsam of Copaiba.

Massa,–ae Copaibae, U. S. P. — Mass of Copaiba — Solidified Copaiba.

Oleum,–i Copaibae, U. S. P.—Oil of Copaiba.

Resin,–ae Copaibae, U. S. P.—Resin of Copaiba.

How would the urine be tested for the resin, and how distinguish it from albumen?

Best given in capsules, but may be given in alcoholic mixtures, Mucilago or Syrupi.

Digitalis, U. S. P.—Digitalis. Refer to No. 9.

How is Infusum Digitalis made and best administered?

Examine desk sample of Digitalis and Tinctura Digitalis.

Hydrargyrum,–i Chloridum,–i Mite,–is, U. S. P.—Calomel.

Has feeble action in itself but often proves a powerful adjuvant.

Nitrites:—Refer to No. 19. What governs their incompatibilities?

Potassium Salts:—Refer to No. 4. (Acetate, Citrate and Nitrate.)
Always administer well diluted with Aqua.
How do they affect the reaction of the urine?

Scilla,–ae, U. S. P.—Squill. Refer to No. 10.
Why not use in Acute Bright's Disease?

Uva,–ae Ursi, U. S. P.—Bearberry.

Extractum,–i Uvae Ursi Fluidum,–i, U. S. P.—Fluid Extract of Uva Ursi.
Incompatible with Argentum, Ferrum and Plumbum preparations, alkaloids, gelatinum and mineral acids.
Why do they color the urine?

What constituent of Hollands (Gin) makes it of value in Chronic Bright's Disease?

Incompatibles—

1. Try Tinctura Digitalis with Acidum Hydrochloricum Dilutum, Plumbi Acetas solution and Tinctura Ferri Chloridi each.
2. Try Syrupus Scillae with Liquor Potassae.
3. Try Extractum Buchu Fluidum with Aqua Destillata.
4. Try Extractum Uvae Ursi Fluidum with an alkaloidal solution and Tinctura Ferri Chloridi.
5. Try Spiritus Aetheris Nitrosi with Acidum Tannicum and Potassii Iodidum solutions each.
6. Try Potassii Acetas and Quininae Sulphas solutions together.
7. Try Ammonii Benzoas solution with Acidum Hydrochloricum Dilutum.

ECBOLICS. EMMENAGOGUES.

Read articles in your text books on each drug and class in general.

Ergota,–ae, U. S. P.—Ergot. Refer to No. 9.
Quinina Salts.—Refer to No. 20.
Powerful Purgatives.
Oleum Rue, Oleum Sabinae, etc.
Asafoetida, Borax, Cantharis and Guaiacum.

PRESCRIPTIONS—

Write out corrections for each and hand to instructors.

1. ℞ Liq. Potass.....
Mag. Sulph.....
Aq. Cinnam. q. s. ft..... oz. IV
M.—Ft. mist.—Sig.

2. ℞ Mist. Rhei et Sodii..... 25.00
Ac. Hyd. (Dil.)..... 5.00
Aq. Dest. ad..... 128.00
M.—Sig.—Teaspoonful every 2 hours.

3. ℞ Extr. Buchu Fl..... 16.00
Spts. Aether. Nit..... 12.00
Ac. Potass..... 20.00
Aq. Chloroformi ad. q. s..... 128.00

4. ℞ Potass. Acetatis..... 100.00
Tr. Cinchonae..... 50.00
Inf. Digitalis ad. q. s..... 256.00
M.—Sig.—Tablespoonful every 3 hours.

Quiz Will Follow this Exercise.

EXERCISE No. 28.

TOPICAL AGENTS.

READ N. D. articles on the drugs considered.

RUBIEFACIENTS.

Camphora,-ae, U. S. P.—Camphor.
Linimentum,-i Camphorae, U. S. P.—Camphor Liniment.
Linimentum,-i Saponis, U. S. P.—Soap Liniment.
Cantharis,-idis, U. S. P.—Cantharides—Spanish Flies.
Ceratum,-i Cantharidis, U. S. P.—Cantharides Cerate.
Collodium,-i Cantharidatum,-i, U.S. P.—Cantharidal Collodion.
Tinctura,-ae Cantharidis, U. S. P.—Tincture of Cantharides.
Capsicum,-i, U. S. P.—Capsicum — Cayenne Pepper — African Pepper.
Extractum,-i Capsici Fluidum,-i, U. S. P. — Fluid Extract of Capsicum.
Emplastrum,-i Capsici, U. S. P.—Capsicum Plasters.
Tinctura,-ae Capsici, U. S. P.—Tincture of Capsicum.
Pix,-icis Burgundica,-ae, U. S. P.—Burgundy Pitch.
Pix,-icis Liquida,-ae, U. S. P.—Tar.
Oleum,-i Picis Liquidae, U. S. P.—Oil of Tar.
Unguentum,-i Picis Liquidae, U. S. P.—Tar Ointment.
Sinapis Alba,-ae, U. S. P.—White Mustard.
Sinapis Nigra,-ae, U. S. P.—Black Mustard.
Oleum,-i Sinapis Volatile, U. S. P.—Volatile Oil of Mustard.

EPISPASTICS.

Cantharis,-idis, U. S. P.—Cantharides.
Acidum,-i Aceticum, i Glaciale,-is, U. S. P.—Glacial Acetic Acid.

Aqua,-ae Ammoniae Fortior,-oris, U. S. P.—Stronger Ammonia Water.

PUSTULANTS.

Antimonii et Potassii Tartras,-atis, U. S. P.—Antimony and Potassium Tartrate.

Oleum,-i Tiglii, U. S. P.—Croton Oil.

EMOLLIENTS.

Adeps,-ipis Lanae Hydrosus,-i, U. S. P.—Hydrous Wool-Fat—Lanoline.

Icthyollum,-i.—Icthyol.

Linum,-i, U. S. P.—Linseed—Flaxseed.

Oleum,-i Lini, U. S. P.—Linseed Oil.

Mel,-is, U. S. P.—Honey.

Mel,-is Despumatum, i, U. S. P.—Clarified Honey.

Petrolatum,-i Liquidum,-i, U. S. P.—Liquid Petrolatum.

Petrolatum,-i Molle,-is, U. S. P.—Soft Petrolatum.

Petrolatum, i Spissum,-i, U. S. P.—Hard Petrolatum.

REFER to Cataplasmata (No. 15), Linimenta (No. 17) and Unguenta (No. 19.)

EXAMINE preparations placed out.

INCOMPATIBLES—

1. Tinctura Ferri Chloridi and Tinctura Cinchonae.
2. Tinctura Guaiaci and Acidum Hydrochloricum Dilutum.
3. Tinctura Cannabis Indicae and Aqua Chloroformi.
4. Liquor Iodi Compositus and Plumbi Acetas solution.
5. Syrupus Scillae and Ammonii Carbonas.
6. Syrupus Ipecacuanhae and Spiritus Frumenti.
7. Sodii Bicarbonas solution and Antimonii et Potassii Tartras.
8. Sodii Phosphas and Magnesii Sulphas solutions.
9. Antipyrinum and Spiritus Aetheris Nitrosi.
10. Hydrargyri Chloridum Mite and Acidum Nitricum Dilutum.

PRESCRIPTIONS—

1. ℞ Ol. Sinapis Vol..... 40.00
   Oleores. Capsic..... 50.00
   Aqua q. s. ad..... 390.00
   M. Ft. Lin. Sig.—Apply.

2. ℞ Ol. Terebinth..... 20.00
Ol. Picis Liq..... 50.00
Aq. Chlor..... 25.00
Muc. Acaciae q. s. ad..... 192.00
M.—Ft. mist. Sig.—Apply to the bruise.

Write out the results giving reasons for the ten incompatible mixtures and also the corrections to be made in the two prescriptions.

This is the last laboratory exercise, hence see that the apparatus is clean and put away in proper condition.

THERAPEUTIC EXERCISES.

THERAPEUTICS.

EXERCISE No. 1.

GENERAL PHYSICS OF ELECTRICITY.

GALVANISM.

A Voltaic or Galvanic cell, composed of two metals placed in a conducting liquid. All metals are electro-positive or electro-negative.

The liquid is usually acid, and a chemical action takes place between the metals and the acid. The acid acts with greater force upon one plate than upon the other, and the one upon which the action is greater is called the positive plate and the other the negative plate. The direction of the current in the cell is always from the positive to the negative plate.

POLES OF A BATTERY—

If two wires connect the metals outside of the cell, the one from the negative plate is called the positive pole and the one from the positive plate is called the negative pole.

CONDUCTORS—

All substances conduct electricity to a greater or less extent.

Good Conductors:—Most all metals. Mercury is a poor conductor. Saline waters and acids are good conductors. Hot water better than cold.

Poor Conductors:—Glass, silk, India rubber, skin, etc.

AMPERE—

Unit of measure of current strength. Explain.

OHM—

Unit of measure of resistance. Explain.

VOLT—

Unit of measure of Electro-motive force. Explain.

RESISTANCE—

Internal and External. Explain them. That of human body is called 3000 ohms, but may vary greatly.

OHM'S LAW—

Current strength equals the Electro-motive Force (E. M. F.) divided by the sum of the Internal and External Resistances (I. R. + E. R.)

$$C = \frac{\text{E. M. F.}}{\text{I. R.} + \text{E. R.}}$$ Explain and illustrate this law.

APPARATUS.

BATTERIES—

Primary:—Until recently the sole source for direct currents in therapeutics. Portable and Stationary. The Portable are hard to construct to furnish high enough E. M. F. for all practical purposes. Requires up to 20 ma. Stationary are easily constructed and maintained; 50 cells furnishing 60–70 V.

Secondary or Accumulators:—Neither convenient nor economical; used in heating cauteries and exploring lamps.

DYNAMOS—

Direct Current Dynamo currents may be readily adapted to therapeutics, thus employing the lighting dynamo or the power dynamos below 500 V. strength. Commutator changes current from that of a primary battery by a slight but uniform variation in strength; the difference could be illustrated by straight and slightly undulating lines; action the same on the system.

Current Regulators—

Rheostats—Fluid, Graphite and Wire.

Fluid Rheostats vary with the amount of fluid used and nature and purity of it. The decomposition going on in them prevents accurate measurement.

Graphite Rheostats also cannot be graduated, as their resistance varies.

Wire Rheostats are most reliable if well made; their resistance can be measured accurately: German silver wire best; very expensive.

Battery Switches—

(Current Selectors)—Used to throw current from greater or less number of cells into the circuit. Does not completely replace the rheostat.

Dynamo Current Controllers: Decrease or shunt the current.

Milliamperemeters—

Measurers of the Current strength.

Therapeutic currents never exceed 500 ma., and usually 5–20 ma.

Two types used in therapeutics; one having the indicating needle itself a magnet, and the other having a bar of soft iron surrounded by a coil of conducting wire suspended between the poles of a permanent magnet. The second is the better form.

Conducting Cords and Tips—

The cords are of wire or brass tinsel, cotton or silk covered; must be of good material to make steady current.

Tips are of all shapes and sizes; should be more uniform for general use.

Electrodes—

Must vary in material, size, shape, etc., to meet requirements of the individual cases; many useless forms now made; requires careful selection.

EXERCISE No. 2.

ELECTROLYSIS.

ELECTROLYSIS—

Electro-chemical decomposition that takes place in the immediate neighborhood of the poles or electrodes.

Anodal Electrolysis is that decomposition occurring around the positive pole.

Cathodal Electrolysis is that occurring around the negative pole.

Electrolyte is the body decomposed by the current.

Anion is applied to the products collected at the positive pole.

Cathion is applied to the products collected at the negative pole.

Electrolysis is due to the chemical action at the entrance and departure of the current. Why must the electrolytes be in solution?

Molecules contain electro-positive and electro-negative constituents and electrolysis causes molecular rearrangements with separation and movement to proper pole. Why the same action on body fluids?

Which collect at the Anode and which at the Cathode?

Amount of electrolysis is governed by the density and strength of the current and length of time of application. What element is deposited on the negative plate in a solution of a Copper salt and how much?

ELECTRODES—

Active and Dispersing. Form, position and use.

ANODAL ELECTROLYSIS.

Meaning.

Anode collects acids, Oxygen, Chlorine, and other electro-negative ions.

The electrodes should be gold or platinum plated. How are those of other metals affected?

Show the effect upon a piece of raw beef.

CAUSES OF THE EFFECTS—

1. The elements attracted.
2. Molecular disintegration.
3. Effect on albumenoid substances.
4. Action of the products of the decomposing needles.

THERAPEUTICS—

Why is it destructive to animal tissues?

1. Angeiomata: Their structure and the reasons for anodal application.
2. Haemorrhagic Mucous Membranes: Nasal and Uterine.
3. Warts, moles, polypi and fungous growths; cut them off at the base unless too large. How is this best done?
4. Parisitical and Bacterial disorders: What is the method of action?

METALLIC ELECTROLYSIS.

Define.

USES:—Copper, Zinc and Iron Electrodes.

Why restricted to the Anode and where should it not be used?

CATHODAL ELECTROLYSIS.

1. Why do we not consider its local effects?
2. Show its action in water.
3. Hydrogen, alkalies, etc., are attracted.
4. Hydrogen gas collects in the meshes of the flesh and the alkalies unite with the albumenoids, softening and liquefying them.

THERAPEUTICS—

1. Cicatrices.
2. Fibromas and Hyperplasias.
3. Fungous growths, warts and non-vascular epithelial growths.
4. Superfluous hairs; size of the electrode and the reasons for it.
5. Exostoses and Enchondroses, as the nasal.

Why is it better than surgery in the above cases?

EXERCISE No. 3.

CATAPHORESIS.

Definitional limitations. Shown first in aiding osmosis.

Elements travel in either direction of the current. Shown by a cotton covered Cathode (moistened with solution of Potassium Iodide) and separated from a cotton covered Anode (moistened in water) by some membrane and free Iodine appears on the Anode cotton. Why and how? Reverse the current and what is the result?

ANODE increases the effect of a solution of Cocaine.

CONCLUSIONS—

1. May pass either way of the current.
2. May convey molecules.
3. Negative elements to Anode and positive to the Cathode.
4. Anode conveys Cocaine, Tincture Aconite, Helleborine, Strychninae Nitrate, Menthol, Mercury Bichloride.
5. Cathode conveys Sulphur, Potassium Iodide, Bromine Salts, Eosine, etc.

THERAPEUTICS—

1. Moving tissue fluids at the operator's will.
2. Removing liquids and substances desirable to eliminate.
3. Introducing medicines.
4. Local anasthesia.

EXAMPLES—

1. Drawing fluids to atrophic or ill nourished tissues by the Cathode, as in Chronic Ulcers, Arthritic cases, etc.

2. Baths; principles upon which the tubs must be constructed.
3. Anaesthesia for minor surgical operations.

Current Strength—

Directly proportional to the electric pressure, electric conductivity of fluids used, and of the surface of the partition and inversely proportional to the thickness of the partition.

CATALYSIS.

Definition. How does it differ from Electrolysis?

Depends upon all the effects previously mentioned, but they do not account for all the effects of the current.

Interpolar chemical action when the Galvanic current passes through the tissues.

Theory:—A liquid with a uniform resistance, the polar molecular decomposition will take an atom from the next inter-polar molecule and so on until the opposite pole is reached. (Grötthuss or Clausius.)

Electrolysis is the basis; calls the *ions* to the poles and these *ions* come from molecular decomposition. Can show this by a solution of Sodium Sulphate in a series of beakers connected by copper wires and a little Phenol-phthalein in each beaker and the passage of the current causes the separation of Soda at the Cathode and the production of a violet color.

Tissues of the body are not homogeneous, hence this theory must be modified there, but the polar actions will occur at each change of tissues.

Secondary Effects—

(Cataphoresis.)

How are they aided by electrotonic effects?

How are the trophic changes caused? Directly by the action on the cell and indirectly by the action on the nerves of the cell.

Final solution depends upon Physiological and Bacteriological Chemistry.

Neurologists and general practitioners use this to check degeneration.

The catalytic action on deep seated tissues is concentrated by reducing the other resistances, as by moistening the skin with saline solutions, also the electrodes, and the latter must be of proper size for the density of the current. The parts treated are more affected the more directly they are in line between the electrodes.

EXERCISE No. 4.

PHYSIOLOGICAL ACTION OF GALVANISM.

Definition: Certain effects neither physical nor mechanical, but dependent upon the peculiar properties of the living organism or tissues and the nature of their responses to this form of stimulus.

Use is made of these effects in detecting grades of pathological changes.

THERAPEUTICAL APPLICATIONS.

Muscle Tissue Reactions—

All the muscles contract.

Striped:—Time of contractions and the reasons.

Strength of normal muscle response depends upon the current strength.

Order of contractions in normal and abnormal muscles differ.

Difficulty of maintaining constant current because of the tissues traversed presenting varying resistances, hence some slight contractions may occur with the changing current.

Unstriped:—Responds more slowly, hence slowly interrupted currents are best. Passive congestions.

Abdominal organs; atony, dilatation, feeble contractions, diminished blood supply, etc., are relieved.

Conclusions:—Direct current excites function, improves and maintains nutrition impaired by abnormal conditions of the muscles or their nerve supply.

Nerve Tissue Reactions—

Differs with peripheral, sensory, motor, secretory, etc.

What is the effect of the application to the tract of a motor nerve and how is this used in diagnosis?

Why is this better than to the muscles themselves?

What is the effect of the Anode and of the Cathode upon sensory nerves?

Electrotonus; Anelectrotonus and Catelectrotonus.

Effects and methods of application of Anode in Neuralgias, etc.

Effects and methods of application of Cathode in sluggish stages.

How do electrolysis and cataphoresis aid the effects? How may we show that all the effects are not due to these actions?

Effects on Protoplasm—

Retrograde metabolism.

Action on cell protoplasm and nucleus; on cell molecules; on cell activities, etc.

Cell nutrition more affected by constant current than by any other.

Best results defined by future researches.

Current of 15–20 Ma. for a few minutes daily gives the best results.

EXERCISE No. 5.

DIRECT CURRENT DIAGNOSIS.

Its proper application requires thorough knowledge of topographical anatomy of the human body, and more than ordinary familiarity with the technique of the electrical appliances.

Basis of Its Application—

Electrodes—Size of the active and the dispersing; positions in use.

How can we proceed from physiological reactions to therapeutical applications to the human body for pathological conditions?

Actions on the Motor Nerves—

Contraction of the Muscles Supplied—How Produced and Varied —Normal Order:—

Cathodal closing (C. C.)
Anodal closing (A. C. or A. C. C.)
Anodal opening (A. O. or A. O. C.)
Cathodal opening (C. O. or C. O. C.)
Method of testing the normal order.
How used to determine increased and decreased irritability?

Action on the Muscles—

Why use in diagnosis?
What is the motor point?
Why avoid the motor point?
Position of the electrodes.
Qualitative and quantitative changes.

Reaction of Degeneration (R. D.)—

A change from the normal order.

Typical and partial R. D. and the diseases in which they are observed.

Indicates the progress of the diseases or of the recovery by its character.

Action on the Sensory Nerves—

Why are their results so slight in value?

Analgesia.

Hyperalgesia.

Motor results distinguish between functional and organic diseases; determine prognosis and the treatment to be employed; assists the orthopedic surgeon to decide the advisability of operations; is a certain means for demonstrating the falsity of feigned paralysis; aids in locating lesions.

Currents for Normal Contractions—

Contraction.	*Ulnar.*	*Musculo-Spiral.*	*Median.*
C. C.	1.0 Ma.	1.8 Ma.	0.8 Ma.
A. C.	1.3 Ma.	3.5 Ma.	0.9 Ma.
A. O.	2.5 Ma.	3.7 Ma.	1.0 Ma.
C. O.	4.9 Ma.	9.0 Ma.	6.0 Ma.

EXERCISE No. 6.

CAUTERY.

Use the heat and not the electricity itself, as the current does not traverse the body.

Galvanic circuit has the same amount of current at every point.

Heating effect depends upon the resistance, hence requires a circuit with small resistance in its main portion but a part of comparatively high resistance where the amount of heat generated is in direct proportion to the quantity of the current passing in a unit of time. The heat may render this portion incandescent.

Cautery circuits should have little or no resistance except at the knife or burner. Why? Construction of the burner and why?

Resistance seldom exceeds 0.1 Ohm and the current strength varies from 2–30 Am. according to the size of the burner and the nature of the work required. Must decrease internal resistance to increase the current.

How does the circuit differ from those where the body forms a part?

Apply Ohm's law to this current.

Sources—

Primary Batteries:—Stationary and portable; small internal resistance and great amount of current. What kind of cells are best? Why use a rheostat? What varies the E. M. F.? Advantages.

Secondary Batteries:—Ideal sources. Use of the rheostat. Advantages:—Cleanly, portable, constant E. M. F., double the Am. hours of the bichromate battery of equal size.

Disadvantages:—Recharging from dynamos, whether used or not; easily damaged in using; can not tell the amount of the charge, hence it may fail at any moment. Short circuit.

Dynamo Currents:—Direct is very convenient if obtainable. Few lamp circuits are strong enough currents. Size of conductors between the mains and the rheostat and the size of the rheostat are determined by the maximum strength of the current required by the cautery. Alternating.

Milliamperemeters:—Why are they not used?

Advantages over the thermo-cautery are the ease of limiting its action, ability to use in cavities, continuous heat, size, accuracy of application, etc.

ELECTRIC LIGHT.

Use in Diagnosis—

1. Illuminating cavities of the body; lamp placed in any convenient position, carried into cavities, brought into contact with the surfaces to be examined.
2. Advantages in surgical uses.
3. Light is whiter, more intense and has less comparative heat.
4. Trans-illumination: Methods of use and regions to which applicable.

Electrodes and Their Structure—

Current Strength:—.3–1.6 Am., owing to the resistance to be met. Ordinary lamps have 3–200 Ohms; trans-illuminating lamps, 3–30 Ohms. Ordinary lamps have far more resistance than the cautery, hence higher E. M. F. and weaker current is required than in the cautery.

Resistances met by the current.

Polarization.

Accessory appliances.

Batteries—Structure and Size—

Primary:—Arrangement and capacity is determined by the resistance of the lamp and the current required to light it.

Apply OHM's law. May decrease internal resistance by increasing size of the zinc plate and carbon plate and using Chromic acid instead of a bichromate, but these are cumbersome and hard to keep in condition.

Secondary:—Better than primary but difficult to maintain.

Dynamos:—Especially if an alternating, use a transformer.

THERAPEUTICS—

1. Similar to sunlight; will tan the skin; arc light promotes and retards vegetation.
2. Bactericidal, especially the violet or chemical.
3. Disinfectant and deodorizer, especially the arc light.

EXERCISE No. 7.

FARADISM.

History.

Principles of its production. Peculiarities of the current. Illustrate by a galvanometer and a galvanic cell; conclusions of this:

1. Metallic conductor with galvanic current flowing brought near to and parallel to another metallic conductor induces a current in opposite direction.
2. Conductors remaining stationary and current of constant strength the induced current stops.
3. Inducing conductor removed causes induced current again, but in same direction as itself.
4. Inducing current of decidedly decreasing strength causes direct current.
5. Inducing current of decidedly increasing strength causes reverse current.
6. Inducing circuit broken, a momentary direct current; closed, a momentary reverse current.

Coils and Currents—

Primary and Secondary Currents and Coils.

Effect on secondary current of opening and closing the primary.

Construction and principles of the coils. How cause alternating?

Strength of secondary coil currents are proportionate to the number of turns of primary coil, multiplied by the number of turns of secondary.

Coarse and fine wire secondary coils and their effects.

Ruhmkorff's coil. DuBois Raymond coil.

Potential of induced current varies with length and diameter of the wire. Strength of current depends upon amount of primary coil covered by secondary coil or amount of the central iron bar covered by the cylinder. Armament for rapid interruption.

Batteries—

DuBois Raymond type is not portable.

Galvanic cell of high E. M. F. and little I. R. to furnish primary current; should be easily cleaned and replenished; able to withdraw elements from the fluid when at rest. Slow and rapid interruptions.

Conclusions—

Galvano-Induction Currents Must Have:

1. A source of electrical energy, such as the ordinary galvanic cell, as there must be a primary current before there can be an induced current.
2. An interrupting device, as the current in the secondary coil, which is the real Faradic current, depends upon the making and breaking of the current in the primary coil for its own interruptions and character. Galvanometer will show a current only upon the interruption of the primary.
3. A primary coil to conduct the inducing current. It should consist of a few turns of a thoroughly insulated, rather large copper wire.
4. A secondary coil, consisting of many turns of insulated fine copper wire, to slip over the primary coil, completely encircling it but not coming in contact in which the induced current is formed.
5. An electro-magnet or core, so that the strength of the current may be intensified, and a sliding cylinder to vary the induction effects and thus modify the strength of the application.

Characteristics of the Induced Currents—

Primary:—Sudden moderate variations; unipolar direction of current.

Secondary:—Sudden great variations; bipolar direction of the current.

Physiological Action—

Primary current (less E. M. F.) causes less pain on normal tissues.
Secondary has greater stimulating effects. Protoplasmic action.

Diagnosis—

Detect increased or decreased excitability.
Muscles respond only when motor nerve is intact or trophic centers normal.
Selection of battery and apparatus for best results.
Method of use for general and local diagnosis.

Therapeutics—

1. Hemiplegia, with exalted muscular contractility.
2. Neuralgia, where pain is not increased by pressure.
3. Hysteria.
4. General debility, for its tonic effects.
5. Diphtheritic paralysis.
6. Anosmia.
7. Muscular rheumatism.
8. Asthenopia, with hyperaesthesia of retina and ciliary nerves.
9. Constipation.
10. Agalactia.
11. Paralysis of the bladder.
12. Amenorrhoea, Dysmenorrhoea, etc.
13. Threatened abortion, Subinvolution of the womb, Sterility, etc.

EXERCISE No. 8.

STATIC ELECTRICITY.

MACHINES—

Structure, mode of working, etc.

History.

Otto von Guericke's machine the first: Winckler, 1740; Ramsden, 1760.

Holst, requiring primary current to be supplied and this is multiplied by induction as the plates rotate. Readily loses its charge when at rest or when the air is warm and humid, and at times it is very hard to recharge.

Topler and Wimshurst machines are self-exciting; metal buttons on a revolving plate come in contact with brushes of wire on arms and this friction starts the current; the metal buttons, etc., are a detriment.

A small Wimshurst to start the charge and a large Holst for medicinal use are a good combination. The Wimshurst being very reliable in creating a difference in potential, as its structure is such as to give a large amount of friction between the metallic buttons and brushes, which are of greater number than on the Topler machine, but the mechanism is not such as to secure durability in large machines, hence not as valuable as a Topler or Holst for quantity of electricity.

Leyden jars on all medicinal static machines to increase the quantity. The inside of one is charged with P. and the other with N., and by induction the outside of each with opposite potential from that within. Conductors connected with outer

coatings of the jars lead off this induced current, which is called the "static induced current," and resembles the current from the fine wire of a medical induction coil, being alternating and interrupted but with high potential, the E. M. F. being far in excess of any medical induction current. Interruptions depend upon what?

Resistance:—E. M. F. required to force a spark across the air gap. Direct currents can not. Most powerful medical-induction coils through small gap only. Static through gap of 8–10 inches (20–25 cm.) Voltage is high but current passing is small, a fraction of an Ma.

Spark:—Due to sudden breaking down of the dielectric, owing to the difference in potential overcoming the resistance of the air gap. Not electricity itself but heat and light generated in intervening matter. Not unidirectional but oscillatory; very rapid; decreasing in amplitude. 1 mm. long indicates E. M. F. of 2000 V.; 1 cm., 10000 V.; 10 cm., 100000 V.

Electric Breeze:—Potential difference may manifest itself besides as a spark. Dust, water, vapor, etc., become charged and are repelled or attracted according to their polarity. A stream of these form the "Electric breeze," and if with light the "Brush discharge."

P. and N. conductors are best determined in the dark, the P. being recognized by the collecting comb tips showing points of light and the N. side presents a brush form of light. Can not tell from the Leyden jars.

Efficiency is maintained by keeping plates free from dust, moisture, etc. Need a surrounding case where air can be dried and dust kept out. All unnecessary points should be avoided.

Quantity is increased by increase in size and number of the plates, but therapeutic application ends at a certain point; 8 plates, 28–36 inches.

Electrodes:—Form depends upon the region to which they are applied.

THERAPEUTICS—

1. Electric massage, causes strong contractions of muscles, little pain.
2. Alleviating pain, sciatica, ovarian pain, acute tonsillitis.
3. Insomnia.
4. Neurasthenia and general nervous disorders.

EXERCISE No. 9.

ALTERNATING CURRENTS.

Many forms.

Currents with similar properties or physical characteristics, no matter what their source, will produce similar physiological effects.

SECONDARY COIL CURRENTS—

Must determine practically all the characteristics of flow and an inducted current, viz.:—Rate of frequency of its interruptions or alternations; degree and regularity of its potential variations; amount of the current; etc., as a basis to compare physical properties, which is first requisite for accurate results.

This current though alternating is interrupted; its N. potential is greater than its P. potential, neither exceeding 300 V.; rate of frequency is variable and does not exceed 250 periods per second; current rarely exceeds 6 Ma.

Can now produce currents in which any one of these factors may be varied to almost any desired extent.

SINUSOIDAL CURRENT—

Extremes of P. and N. variations of potential are equal; rise and fall from the maximum to zero is gradual and uniform; continuous; may differ as to their E. M. F. and the frequency of their alternation rate.

Strictly sinusoidal current waves are not produced.

Medical magneto-electric machines, without a commutator, give sinusoidal current.

Machine Structure—

Frame; 12 poles; primary or field coils; secondary or delivery coils; armature.

Driving the armature changes a continuous primary current into alternating secondary waves by its slots and projections; 24 alternations or 12 periods per revolution and 80 revolutions per second are possible.

Strength of the secondary current depends upon that of the primary, and a rheostat will vary this independent of the rate of frequency.

Sources of the primary current; an available capacity of 2 Am.

Flow of the current; its strength, character, etc.

Ordinary applications the E. M. F. is less than 20 V.; alternanations 1000 per second; current strength, 6–8 Ma.

Physiological Actions—

1. Vigorous but painless contraction of the muscular tissues.
2. Slight sensory excitation, analgesia and anaesthesia of sensory nerves.
3. Vaso-motor stimulation.
4. Stimulation of secretions.
5. Sensation of light when an electrode is on the head or neck and the current is strong.
6. Quickened nutrition.

1 and 2 are the most marked and oftenest used.

Uses—

Electrical massage.

Neuralgia, especially pelvic.

Ovarian and Uterine congestions.

The painless contraction is a great advantage in using about the face.

High Frequency or High Potential Currents—

How do they differ from those formerly considered?

Limits reached.

Nikola Tesla, Elihu Thomson and Hertz and their experiments and apparatus.

Frequency of periods of alternating currents depends upon the number of poles in the field magnet.

Results—

No effect on motor nerves; slight feeling of warmth of sensory nerves; muscles not contracted; tissue changes increased; blood vessels dilated by lowered pressure.

Why no marked effect on the human organism?

Indicated in gout, rheumatism or chronic nutritive disorders.

EXERCISE No. 10.

MASSAGE.

INFLUENCE is essentially mechanical, producing purely physiological effects.

OBJECTS—

1. Arouse superficial reflexes.
2. Combat and overcome resistance (nervous and circulatory) by direct pressure.
3. Promote oxidation and respiration of the tissues.

RESULTS—Essentially vital.

1. Overcoming undue stress, tension and pressure in the tissues.
2. Restoring vaso-motor balance, giving endosmosis and exosmosis free play.
3. Promotes secretion, absorption and assimilation.
4. Raises the temperature of the limbs.

SCHREIBER sums up as follows:—

1. Increased blood supply to the muscles and soft parts, thus increasing the circulation and removal of poisonous wastes; strengthening muscle fibres by increasing molecular vibrations; inducing changes in muscle and nerve fibres themselves.
2. Causes absorption of exudate, transudates and infiltrates in accessible organs, separates adhesions in tendon sheathes and joints.
3. Increases oxidizing powers of the blood by passive and active exercise of all the muscles.
4. Relieves congestions of internal organs by calling blood to the muscles.
5. Stimulates the unstriped muscle fibres.

MASSEUR. MASSEUSE. MASSEED.

TECHNIQUE—

Effleurage:—Stroking (superficial, light, frictional movements).

Petrissage:—Kneading and pinching.

Tapotement:—Percussion; slapping with the palm; hacking with the ulner border of the hand; punctation with the finger tips; beating with the closed fist.

Passive Movements of the Joints:—All normal motions possible.

RULES—

1. Treatment of 5–30 minutes' duration.
2. Patient must not feel any pain or disagreeable fatigue after treatment.
3. Patient should rest at least half an hour after treatment.
4. Treatment should not be applied within two hours after a meal.
5. Temperature of the room should be 70 degrees Fahrenheit.
6. Part masseed should be immediately covered up.
7. Treatment should always be under the direction of a physician.
8. *Silence* should always be observed during a treatment.

THERAPEUTICS—

General Massage:

Anaemia.
Plethora.
Neurasthenia.
Hysteria.

Local Massage:

Paralysis from either brain or spinal disease.
Neuralgia.
Dyspepsia.
Constipation.
Chronic uterine affections.
Chronic rheumatism.
Gout.
Occupation neurosis.
Spinal curvature.
Headache.

EXERCISE No. 11.

ENEMATA.

KINDS—

1. Promote rectal evacuations.
2. Medicinal, for agents acting on the bowel mucuous membranes.
3. Rectal irrigations.
4. Nutrient.

METHOD OF ACTION—

1. Reflexly from irritation of the bowel linings. Amount and temperature of the fluids must be considered, cold being more irritating. Habitual use increases tolerance and capacity of the rectum. Consist of water of all temperatures, soap suds, etc. Cone of soap or oiled paper for infants.
2. Medicated may be emolient, anodyne, astringent, anthelmintic, laxative or cathartic. May contain Aloes, Magnesii Sulphas, Oleum Terebinthinae, Oleum Ricini, Glycerinum, etc.
3. Rectal irrigation requires large amounts of water or Normal Salt Solution at the body temperature. Requires a rectal tube, a flexible rubber tube 3–4 feet long with a funnel at end. Patient on either side, hips elevated (Sim's for females and knee-chest for males.) Tube inserted and passed up to the sigmoid flexure; attach the flexible tube; govern rate of flow by height of the funnel.

Gentle manipulations.

Dangers:—Imperious desire for stool, injury of bowel linings, rupture of bowel; cardiac syncope from sudden dilatation. Possibilities of passing Ileo-caecal valve.

4. Nutrient requires small amounts and at rectal temperatures, regard for laws of diffusion. Relieves gastric wounds, operations or irritable conditions. Requires predigestion as rectum is not a digestive organ. Peptonized milk the best basis. Tinctura Opii may be added if rectum is irritable. Fresh defibrinated blood at rectal temperature, but this causes constipation, fetid stools, coating on linings of bowels and decreased absorption, hence requires irrigation 1-2 per week. Amounts used and frequency.

THERAPY—

1. Constipation, especially with bleeding piles.
2. Thread-worm: Astringent, Aloes, Quassia.
3. Impacted feces, etc.: Rectal irrigation.
4. Intestinal invagination: Large amounts of carbon dioxide gas. How?
5. Cholera: Acidum Tannicum, Normal Salt Solution.
6. Diarrhoea, Dysentery: Astringent, Tinctura Opii.

BLADDER FLUSHING.

Soft catheter. Method of its use.

Double current catheter and its objections.

Bulb syringes, holding 6 oz., tapering nozzle to fit any catheter is best.

Davidson piston syringe. Fountain syringe is best for the patient to use; having a two way stop-cock. Water 110°F. in the bag to be 100°F. in bladder. Throw fluid in gently until feeling of moderate distension and then empty and repeat until washings are clear, then use medicated.

USES—

1. Dilated and hypertrophied bladder, habitually congested and secreting much mucous; remove all, leaving nothing to ferment.
2. Prevents stone formation.
3. Relieves congestions at bladder neck.

Kinds—

1. Water at 100°F; soothing, cleansing, causing no contractions.
2. Medicated with Acidum Boricum, Plumbi Acetas, Zinci Sulphas, Argenti Nitras.

EXERCISE No. 12.

LAVAGE.

Definition. History.

Technique (Baruch's)—

1. *Preliminary Preparations*—

Patient—Explain object and difficulties of the treatment, how he should act, method of the introduction, dangers, etc. Remove artificial teeth, if any. Proper time after a meal, if for diagnosis.

Apparatus—Tube of proper size, thoroughly cleansed; basin to receive the washings; towels, etc., to protect the patient's clothing; reservoirs for the solutions to be used; 2–6 qts. of water, warm; other things necessary if desired to test the washings.

2. *Introduction of the Tube*—

Patient in a chair with the head thrown back; operator at patient's right side; tube warmed with warm water, not oil; patient's mouth open, pass point of tube along roof of the mouth to the posterior wall of the pharynx; patient's head forward, directing him to swallow and despite the gagging, in which there is no danger, the tube aided by the mucus will pass directly into the stomach, which is told by the amount of tube swallowed. Spasmodic contractions may cause few minutes' delay.

3. *Method of Washing*—

Pour in a pint of warm water slowly and if vomiting occurs have patient lean forward, allowing the vomit to come out

through and around the tube; may need epigastric pressure. Govern flow by height of the funnel; may have to raise to force away blocking pieces of food, etc. *Lower* funnel end promptly before all has entered, thus keeping out the air and starting the reverse current by siphonage. Repeat till washings are clear.

4. *Examination of Washings and their Indications*—

Much undigested foods indicate weak digestion.

Much thick, glairy gastric mucus indicates gastric catarrh.

5. *Testing the Gastric Juice*—

Reaction, Total Acidity, Free HCl, Lactic Acid, etc.

6. *Introduction of Nutrient Materials*—

DeBove's Powder:—Fresh meat minced finely, dried in an oven at 110° C., powdered. May be mixed with milk, beef tea, malt, soft eggs, bouillon, etc. Four times the strength of fresh meat. Once daily at first, then 2–4 times per day; ½ to 1 oz. first day, ¾ oz. may be given daily. Used in all forms of phthisis except where high fever, gastric catarrh.

7. *Diagnosis*—

Strümple's method:—Empties stomach 7 hours after definite meal.

Leube pours 3 oz. of ice water into the stomach and removes the gastric juice excited by it.

Riegel evacuates stomach some hours after meal, takes up in sponges, squeezes them out, filters and tests filtrate for acids, etc.

Tropoelin color test. Methyl violet test. Uffelmann.

8. *Lavage in Children.*

THERAPEUTICS—

EXERCISE No. 13.

HYDROTHERAPY.

DEFINITION. HISTORY.

Physiological Effects—

Cold water externally abstracts heat and affects internal organs through the nervous system.

Cold baths cause general chilliness at first; then reaction.

Warm water: degree of effect is influenced by the temperature, but quality of effect is the same.

Sense of warmth: effects on circulation and respiration; diaphoresis, tissue changes and muscular relaxation.

Modes of Application—

Cold bath: 40– 60F. until complete reaction for tonic effect.

Tepid " 85– 90F.

Warm " 95–100F.

Hot " 100–106F.

Length of bath depends upon effects desired.

Contraindicated in diseased cerebral arteries. (Hot.)

Russian or steam baths or hot wet packing—

Method of Russian bath: giving steam baths in bed, etc., slacking lime under a blanket.

Warm fomentations.

Wet pack—

Method of application.

Rubbing.

The Douche or Shower bath.

Not higher than 10 feet nor more than 4 inch column, hose to water pipe, large pitcher with suitable spout; any temperature; from any direction.

Hip or Sitzbath.

THERAPY.—

Tonsilitis, etc.: Ice in mouth; wet pack on neck.
Spasmodic croup: Iced pack to neck; cold douche.
Habitual constipation: Morning, glass of cold water.
Diuretic action, as in Acute Nephritis.
Coma, Uraemic: Vapor baths, etc., to excite diaphoresis.
Acute Rheumatism, etc.: Russian bath.
Lead poisoning, etc.: Vapor baths.
Fevers: Cold baths; large drinks of cold water.
Typhoid: Brand's method.
Hyperpyrexia, Delirium, etc.: Cold baths.
Constitutional Syphilis: Vapor bath.
Chronic Rheumatism, especially muscular: Vapor bath.
Acute cerebral congestion: Cold douche to head.
Meningeal hemorrhages: Cold douche to head; ice bag.
Nervous Diseases: Tonic; Cold plunge, shower, cold sitzbath, ice bags, half baths, brine baths.
Sedative: Lukewarm, wet pack, vapor, hot sitz.
Chest inflammations: Wet packing.
Anaesthesia, etc., are often benefited by ice bag, pack, hot or cold affusion
Backache due to spinal anaemia: Hot sponge to spine.
Abdominal inflammations.
Uterine haemorrhage: Cold.
Surgical uses.
Prof. Hamilton's method.
Chronic Gastric Catarrh: Hot water.
Dyspepsias: Hot water. How used. Why?
Emesis: How brought about?

EXERCISE No. 14.

COUNTER IRRITATION.

THEORY—MODE OF ACTION—

Superficial vessels dilated; surrounding vessels more or less so; increased heart action; raised body temperature; exalted nervous irritability; affects trophic nerve function of the parts; moderate exalting, and excessive causing atrophy.

Causes serum exudates: their effects.

EFFECTS—

1. Decreases gross amount of blood serum and thus decreases blood pressure.
2. Removes toxic materials from tissues and fluids of inflamed parts.
3. Relieves pain.
4. Systemic effects.

FORMS—

Rubefacients (Reddeners): — Mustard preparations; plasters; liniments.

Epispastics (Blisters):—Cantharides preparations; the cerate being the strongest, but the Collodion the most convenient. Iodine. Firing-method.

Pustulants (Pusformers):—Tartar Emetic; Oleum Tiglii.

THERAPY—(Method of use in each case.)

Nausea, vomiting, etc.: Mustard, etc.

Typhlitis, etc.: Turpentine stupes (early).

Chest inflammations: Mustard, etc.

Meningeal inflammations: But little benefit.
Hysteria: Blisters.
Neuritis: Blisters over seat of trouble.
Gleet: Blisters over perinaeum.
Rheumatism: Acute, Chronic, Muscular and Inflammatory.
Joints.

Contraindications—

Pregnancy; Acute inflammations; infancy; debility; purpura.
Treatment of burns from too severe applications.
Strangury is lessened by diluent drinks.

ACUPUNCTURE.

Needles; rapidly rotated and inserted.
Baunscheidt's method.
May diminish local sensibility by Sleich's method of "Local Anaesthesia," or by any other convenient method.
Occasionally gives relief in Lumbago, Myalgia, Sciatica, Tic Douloureux.

HYPODERMATOCLYCIS.

Method of use and action.

CUPPING.

Form of cups, method of application and effects. Wet and dry cups. Improvised bottles.

LEECHES.

Action, application and effects. Salt makes leech loosen its hold.

HYPODERMIC MEDICATION.

Syringe: structure and method of use.
Therapy and theory of action.

INTRAVENOUS.

Methods; applications; dangers.

EXERCISE No. 15.

PNEUMOTHERAPY.

OXYGEN.

PREPARATION—

Must be pure as possible.

1. Heating Hydrogenii Dioxidum is best but very expensive.
2. Heating Potassii Chloras 5 parts and Mangani Dioxidum 1 part to dull redness in a suitable iron retort, passing the gas through water.

EFFECTS—

Constitutional disturbances slight. Sensation of warmth, irritation, etc., in the air passages. Pulse usually increased; oxygenation of the blood improved; red corpuscles increased in number and power. No constant influence on secretions. Mental exhilaration with slight giddiness. Appetite, digestion and assimilation improved. Uric acid decreased. Carbon dioxide expiration increased.

THERAPY—

Dyspnoea or asphyxia from any cause. Chronic ulcers; general strumous cases. Anaemia and chlorosis. Chronic Albuminuria. Phthisis. Pneumonia cyanosis. Senile, per rectum. Acute infections. Depressed temperature. Dyspepsia.

ADMINISTRATION—

Dose is from 1–5 gallons; pure or mixed with air, etc. Respiration deliberate; no danger whatever. Cylinders, gas bags, etc., and mode of use. Davidson's syringe per rectum. Temperature of interior of body.

OZONE—

Preparation, properties, uses, ozonized air and water.

HYDROGENII DIOXIDUM.

EFFECTS—

Germicide, pus destroyer and deodorant. 3% solution. Uses

NITROGENII MONOXIDUM.

PREPARATION—

Heating Ammonii Nitras, washing gas in water.

EFFECTS—

Similar to pure Nitrogen. Anaesthesia. Stimulant.

USES—

Minor operations; Dyspnoea; Neurasthenia; Melancholia.

ADMINISTRATION—

Apparatus. Combined with 10% Oxygen.

PNEUMATIC DIFFERENTIATION.

Williams' pneumatic cabinet; structure, etc.

Baths of compressed or rarefied air, with or without excess of Oxygen.

ANAESTHESIA.

Technique of Chloroform; of Ether.

Dangers of each and how to avoid and treat them.

INHALATIONS.

Drugs so used are intended to relieve the respiratory tract.

Powders. Moist air.

Steam laden with the drugs.

Air laden with the drug fumes.

Gases. Atomizing Sprays.

ATOMIZERS are worked by compressed air or by escaping steam from a small boiler.

Apparatus and method of their use.

Formulae—

1. Spiritus Ammoniae Aromaticus in Syncope, etc.
2. Equal parts of Acidum Carbolicum and Aqua Ammoniae Fortior and 3 parts of Alcohol for Acute Coryza.
3. Tinctura Benzoini Compositi for dry catarrhal conditions.
4. Tinctura Iodi Composita, 10–20 drops at an inhalation.
5. Dobell's solution or Seiler's tablets.
6. Antiseptic preparations.
7. Astringents.
8. Sedatives.
9. Creosote 4, Magnesium Carbonate 1, water 20. Use teaspoonful at a time.

EXERCISE No. 16.

BEEF PREPARATIONS.

Beef Juice—

Broil a pound of round steak one or two minutes, or until the juice will flow. Cut it into small pieces. Warm a lemon squeezer by dipping it into hot water and squeeze the juice into a bowl placed over warm water. Salt and serve without reheating.

Beef Tea—

The best pieces for beef tea are the round and the rump, as they contain the most and best flavored juices. Remove all fat and skin, cut into small pieces, put into a glass jar or wide mouthed bottle, using a cup of cold water to the pound of beef. Beef tea should not be strained as the sediment contains the nutritious part.

Beef Extract—

Prepare as for beef tea but omit the water.

Scraped Beef—

Scrape raw beef to a pulp, make it into small cakes and broil, as steak. Season with salt and pepper and serve hot.

Raw Beef Sandwiches—

Scrape fine a piece of fresh, tender, raw beef. Season with salt and pepper; spread it on thin slices of bread and put them together like a sandwich. Cut into small squares or long strips.

MILK PREPARATIONS.

Sterilized Milk—

Put the milk into a glass jar or bottle, cover the mouth with sterilized cotton. Place the jar in a kettle or other vessel that is deep enough to hold sufficient amount of water to reach to the top of the milk in the jar. Allow the water to come to a boiling point but do not boil it. Keep it at this temperature for one hour.

Junket—

Put into an earthen dish a pint of milk, a tablespoonful of sugar and one tablespoonful of liquid rennet. Stir to dissolve the sugar; cover and place in a warm place. As soon as it becomes solid remove to a cool place so that the separation of the casein will not go on too far and the whey appear. Flavor with wine, brandy or nutmeg.

Peptonized Milk for Nutrient Enemata—

Add to a pint of milk one gill of cold water. Put in a tube full of Fairchild's Peptonizing Powder. Place in a warm bath for an hour.

Koumyss—

One quart of perfectly fresh milk, one-fifth of a cake of Fleischman's yeast, one tablespoonful of sugar. Dissolve the yeast in a little water and mix it with the sugar and milk. Put the mixture into strong bottles (beer bottles with shifting corks are the best). Shake the bottles for a full minute to mix the ingredients, then place on end in a refrigerator or equally cool place, to ferment slowly. At the end of three days lay the bottles on their sides; turn occasionally. Five days will be required to perfect fermentation.

BEVERAGES.

Cocoa—

One teaspoonful cocoa, one teaspoonful sugar, enough hot water to dissolve them. Pour into one cup boiling milk, let boil up once and serve immediately.

COFFEE—

One heaping tablespoonful of ground coffee to one cup, or one half pint boiling water. Stir into the coffee a little raw egg and one tablespoonful of cold water; pour on the boiling water and let simmer for five minutes and steep ten. Serve immediately.

TEA—

One teaspoonful of tea to one cup or one-half pint boiling water, cover closely and let stand three minutes and then pour off.

When closely rolled tea is used the quantity should be diminished one-half or two-thirds.

EGG PREPARATIONS.

SOFT BOILED—

Pour enough boiling water into a saucepan to more than cover whatever number of eggs are to be cooked; then put the eggs in the same saucepan and let stand for ten minutes on the hearth or any place where the water will not lose its warmth too quickly. The pan should remain uncovered.

EGG-NOGG—

No. 1—Beat the yolk of one egg, add one tablespoonful of sugar and beat to a cream. Add one tablespoonful of wine or brandy and a half cup of milk. Beat the white to a stiff froth and stir in lightly.

No. 2—Beat the white of one egg to a stiff froth and into it beat the yolk and one teaspoonful of sugar; add a tablespoonful of brandy and a half cup of milk and stir or beat well together. Whiskey, vanilla extract or grated nutmeg may be substituted for the brandy.

GRUEL PREPARATIONS.

OAT MEAL GRUELS—

No. 1—Put one cup of rolled oats into a bowl, fill bowl with water, stir well and let settle for a few minutes; then pour the milky looking water into a saucepan until it no longer appears white. Boil the water for half an hour. For every pint put in a small or saltspoonful of salt and a half cup of sweet cream or milk.

No. 2—One large tablespoonful of rolled oats to one pint of water. Boil down one-half; then strain through a wire sieve, salt and add an equal quantity of milk. Sugar may be added if desired.

Prepared Flour Ball—

Tie one pint of flour in a stout cloth; put into boiling water and boil four hours, then bake four hours. Pare off the outer coating and grate the powder from the ball as it is wanted to make the gruel of the desired consistency. To a half pint of boiling milk add one tablespoonful of the powder, wet with cold milk or water. Boil for five minutes; add a little salt and serve.

Flaxseed Lemonade—

One tablespoonful of flaxseed, one pint of water, one tablespoonful of sugar and the juice of one lemon. Boil the flaxseed in the water half an hour; strain it and add the lemon juice and sugar.

Rice Water—

Wash two tablespoonfuls of rice, add one quart of cold water and boil until the rice is very tender. Strain and add salt to the taste. A little sugar and also nutmeg may be added if desired.

Barley Water—

One tablespoonful of pearl barley, three blocks of sugar, one-half a lemon and one quart of boiling water. Wash the barley in cold water, pour off the water and put the barley, sugar and lemon into the boiling water and let it stand covered and warm for three hours and then strain it and serve.

Toast Water—

Toast one pint of white or brown bread crusts very brown, being careful not to burn them. Add one quart of cold water, let it stand for one hour and then strain and add sugar and cream to the taste.

ALBUMINURIA.

MAY TAKE—

SOUPS.

Thin Soups. Beef Tea. Broths.

FISH.

Oysters. Fish of all kinds.

MEATS.

Chicken. Game. Sweetbreads.

BREAD AND FARINACEOUS ARTICLES.

Bread. Cornbread. Rice. Macaroni.
Sago. Tapioca.

VEGETABLES AND FRUITS.

Potatoes. Spinach. Celery. Lettuce. Cresses.
Beans. Peas. Baked and Stewed Apples.
Oranges. Prunes. Peaches.

DRINKS AND LIQUIDS.

Waukesha. Distilled or Rain Water, abundantly.
Koumyss. Milk. Buttermilk.

AVOID—

All fried foods, Beef, Mutton, Eggs, Made dishes, Desserts, strong Tea and Coffee, all Alcoholic stimulants.

DIABETES.

MAY TAKE— SOUPS.

Plain.

FISH.

All kinds. Oysters. Clams. Lobsters Shrimps.

MEATS.

All kinds. Poultry. Game Bacon.

EGGS.

BREAD AND FARINACEOUS ARTICLES.

Bread and biscuits made with prepared gluten flour.

VEGETABLES.

Green Vegetables, such as
Summer Cabbage, Turnip Tops, Spinach, Water Cresses,
Mustard, Sauerkraut, Lettuce, Sorrel, Mushrooms,
Celery, String Beans, Dandelion, Chicory, Cold
Slaw, Brussels Sprouts, Cucumbers, Olives,
Asparagus, Truffles, Radishes, Onions,
Pickles.

DESSERTS.

Custards without Sugar. Eggs. Cheese. Butter.
Jellies, unsweetened. Nuts, except Chestnuts.

DRINKS AND LIQUIDS.

Water. Underwood Spring Water. Koumyss.
Buttermilk. Dry Wines in moderation. Claret.
Sherry. Burgundy. Acid Fruits. Lemons.
Currants. Tea. Cream.
Coffee without Sugar.
Saccharine may be used in place of sugar. One grain will sweeten a cup of coffee or tea.

AVOID—

Sweet Milk, Liver, Bread, Biscuits, Toast. FARINACEOUS VEGETABLES, such as Potatoes, Rice, Oatmeal, Cornmeal, Sago, Tapioca, Arrowroot, etc. SACCHARINE VEGETABLES, such as Turnips, Carrots, Parsnips, Green Peas, French Beans, Beet Root, Tomatoes, Fruits of all kinds. All Preserves, Syrups, Sugars, Cocoa, Chocolate, Cordials, Sweet Wines. All Pastry, Puddings, Ice Cream, Honey.

URIC-ACIDAEMIA.

BREAKFAST—

Porridge of wheat, oats or cornmeal, eaten with milk; a few mouthfuls of fish or egg; one or two pieces of bread, or its equivalent in toast, plenty of butter; a cup of milk flavored with tea, coffee or cocoa.

LUNCH—

Potato and one other vegetable, eaten with butter; pudding, tart or stewed fruit; biscuits and butter; a little fruit, milk.

DINNER—

Soup, fish, fowl or game, a small portion; two vegetables with sauces or butter; biscuits and butter; any ordinary pudding or stewed fruit; fruits.

DYSPEPSIA.

MAY TAKE—

SOUPS.

Thin Soups. Beef Tea. Broths.

FISH.

Raw Oysters.

MEATS.

Beef. Mutton. Lamb. Chicken. Game. Venison.
Chopped Meat.

EGGS.

Poached. Soft Boiled. Raw or whipped up with water and liquor or wine.

BREAD AND FARINACEOUS ARTICLES.

Bread, sparingly. Corn-bread. Stale bread and butter.
Rice Cakes. Macaroni. Sago. Tapioca.
Cream Crackers. Dry Toast.

VEGETABLES AND FRUITS.

Green Vegetables, such as
Spinach, Turnip tops, Cresses, Salads, Celery, Sorrel, Lettuce, String Beans, Dandelion, Chicory, Asparagus.
Oranges, Ripe Peaches and Pears, Apples roasted, and Thoroughly cooked dried fruits.

DRINKS AND LIQUIDS.

Water abundantly. Hot water before meals. Koumyss.
Buttermilk. Milk and Lime water. Milk and Seltzer.
Tea. Claret. Dry Wines.
Thoroughly masticate all foods.

AVOID—

Rich Soups, All Fried Foods, Veal, Pork, Hashes, Stews, Turkey, Sweet Potatoes, All starches and saccharine articles. All Gravies, Made Dishes, Sauces, Desserts, Pies, Pastry, Puddings, Ice Cream, Sweet Wines, Malt Liquors, Cordials, Uncooked Vegetables.

OBESITY.

MAY TAKE—

SOUPS.

Beef, Mutton and Chicken Broth.

FISH.

All Kinds.

MEATS.

Lean Beef. Lean Mutton. Chicken. Game.

EGGS.

VEGETABLES.

Asparagus. Cauliflower. Onions. Celery. Cresses. Spinach. White Cabbage. Tomatoes. Radishes. Lettuce. Greens. Squash. Turnips.

BREAD AND FARINCEOUS ARTICLES.

Stale Bread and Toast sparingly. Gluten Biscuits. (Only 4 oz. Bread per diem.)

DESSERTS AND FRUITS, ETC.

Grapes. Oranges. Cherries. Berries. Acid Fruit.

DRINKS.

Tea or Coffee without sugar or milk. Wine occasionally. Exercise plentifully.

AVOID—

Fat, Thick Soups, Sauces and Spices, Hominy, Oat Meal, Maccaroni, White and Sweet Potatoes, Rice, Beets, Carrots Starches, Parsnips, Puddings, Pies, Cakes, all Sweets, Milk, Water.

(If urea is in excess), Alcoholic Drinks, Malt Liquors. Avoid Water in excess.

CHRONIC RHEUMATISM AND GOUT.

MAY TAKE—

SOUPS.

Vegetable Soup, except Pea or Bean.

FISH.

Fresh Fish. Raw Oysters. Raw Clams.

MEATS.

Beef. Mutton. Chicken. Ham. Bacon. Game.

FARINACEOUS ARTICLES.

Bread. Bread from whole wheat. Crackers.
Rye Bread. Oatmeal. Cracked Wheat.
Milk Toast. Rice.

VEGETABLES.

Potatoes. Fresh Vegetables.

DESSERTS.

Milk Puddings. Fruits of all kinds in moderation if not too acid.

DRINKS.

Water, plentifully. Lemon Juice. Old Whisky. Gin.
Dry Wines when needed. Milk. Weak Tea.

Meats and Nitrogenous Food in moderation.

An absolute milk diet is sometimes necessary and curative.

AVOID—

Soups, Eggs, all made dishes, Gravies and Spices, Pork, Veal, Turkey, all Pies, Pastries and Rich Puddings, Patties, Confectionery, Sweet Wines, Burgundy, Heavy Claret, Cordials, Malt Liquors, Tobacco, Asparagus, Peas, Beans, all Acid Fruits.

Under all circumstances let the rule be abstemiousness.